



# Magnetotelluric Data, Across Quartzite Ridge, Nevada Test Site, Nevada

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## **Introduction**

Nuclear weapons are integral to the defense of the United States. The U.S. Department of Energy, as the steward of these devices, must continue to gauge the efficacy of the individual weapons. This could be accomplished by occasional testing at the Nevada Test Site (NTS) in Nevada, northwest of Las Vegas. Yucca Flat Basin is one of the testing areas at the NTS. One issue of concern is the nature of the somewhat poorly constrained pre-Tertiary geology and its effects on ground-water flow in the area subsequent to a nuclear test. Ground-water modelers would like to know more about the hydrostratigraphy and geologic structure to support a hydrostratigraphic framework model that is under development for the Yucca Flat Corrective Action Unit (CAU).

During 2003, the U.S. Geological Survey (USGS) collected and processed Magnetotelluric (MT) and Audio-magnetotelluric (AMT) data at the Nevada Test Site in and near Yucca Flat to help characterize this pre-Tertiary geology. That work will help to define the character, thickness, and lateral extent of pre-Tertiary confining units. In particular, a major goal has been to define the upper clastic confining unit (UCCU) in the Yucca Flat area. Interpretation will include a three-dimensional (3-D) character analysis and two-dimensional (2-D) resistivity model. The purpose of this report is to release the MT soundings across Quartzite Ridge, Profiles 5, 6a, and 6b, as shown in **Figure 1**. No interpretation of the data is included here.

## **Magnetotelluric Method**

The MT method is a passive surface geophysical technique that uses the Earth's natural electromagnetic fields to investigate the electrical resistivity structure of the subsurface. The resistivity of geologic units is largely dependent upon their fluid content, porosity, degree of fracturing, temperature, and conductive mineral content (Keller, 1989). Saline fluids within pore spaces and fracture openings can reduce the resistivity of a resistive rock matrix. Resistivity also can be lowered by the presence of conductive clay minerals, carbon, and metallic mineralization. It is common for altered volcanic rocks to contain authigenic minerals that have resistivities of one tenth of those of the surrounding rocks (Nelson and Anderson, 1992). Increased temperatures cause higher ionic mobility and mineral activation energy, reducing rock resistivities significantly. Unaltered, unfractured igneous rocks are moderately to highly resistive (hundreds to thousands of ohm-m), whereas fault zones will show low resistivity (less than 100 ohm-m) when they are composed of rocks that are fractured enough to have hosted fluid transport and consequent mineralogical alteration (Eberhart-Phillips and others, 1995).

Carbonate rocks are moderately to highly resistive (hundreds to thousands of ohm-m) depending upon their fluid content, porosity, fracturing, and impurities. Marine shales, mudstones, and clay-rich alluvium normally are conductive (a few ohm-m to tens of ohm-m). Unaltered metamorphic rocks (non-graphitic) are moderately to highly resistive (hundreds to thousands of ohm-m). Tables of electrical resistivity for a variety of rocks, minerals, and geological environments are included in Keller (1987) and Palacky (1987).

The MT method can be used to probe the Earth's crust from depths of tens of meters to depths of tens of kilometers (Vozoff, 1991). Natural variations of the Earth's magnetic and electric field are measured and recorded at each MT station. The primary frequency bands used by the MT method are 10,000 to 1 hertz (Hz) from worldwide lightning activity and 1 to 0.0001 Hz from geomagnetic micro-pulsations. The natural electromagnetic waves propagate vertically in the Earth because the large resistivity contrast between the air and the Earth causes a vertical refraction of the electromagnetic wave transmitted into the Earth (Vozoff, 1972).

The natural electric and magnetic fields are recorded in two orthogonal, horizontal directions. The vertical magnetic field ("tipper") also is recorded. The resulting time-series signals are used to derive the tensor apparent resistivities and phases. First, the signals are converted to complex cross-spectra using Fast-Fourier-Transform (FFT) techniques. Then, least-squares, cross-spectral analysis (Bendat and Piersol, 1971) is used to solve for a transfer function that relates the observed electric fields to the magnetic fields with the assumption that the Earth consists of a two-input, two-output linear system. Prior to conversion to apparent resistivity and phase, the tensor normally is rotated. This rotation could be into principal directions that correspond to the direction of maximum and minimum apparent resistivity, or it may be made perpendicular to the survey traverses. For a two-dimensional (2-D) Earth, the MT fields then can be decoupled into a transverse electric (TE) mode (which uses the electric field perpendicular to the survey direction and the magnetic field parallel to the survey direction) and a transverse magnetic (TM) mode (which uses the electrical field parallel to the survey direction and the magnetic field perpendicular to the survey direction). Two-dimensional modeling generally is done to fit both modes. When the geology satisfies the 2-D assumption and the MT survey is perpendicular to the geologic strike, the MT data for the TE mode represent the electric field parallel to geologic strike, and the data for the TM mode represent the electric field across strike, along the survey direction. The MT method is well suited for studying complicated geological environments because the electric and magnetic relations are sensitive to vertical and horizontal variations in resistivity. The MT method is capable of establishing whether the

electromagnetic fields are responding to subsurface terranes of effectively one, two, or three dimensions. An introduction to the MT method and references for a more advanced understanding are in Dobrin and Savit (1988) and Vozoff (1991).

### **Magnetotelluric Survey**

From October to December of 2003, data were collected at 51 stations across the Yucca Flat Basin. The station locations were chosen to constrain the geologic/hydrostratigraphic interpretation, for proximity to roads, and to avoid, where possible, electrical noise from power lines and vehicles. The low frequency data (0.0002 to 200 Hz) were collected with an Electromagnetic Instruments, Inc., (EMI) MT24/LF 24-bit system (EMI, 2002), and the high-frequency data (4 Hz to 23,000 Hz) were collected with a portable EMI MT-1 system (EMI, 1996). For the low frequency, horizontal electric fields were measured using three copper-copper sulfate porous pot electrodes placed in an L-shaped array with dipole lengths of 30 meters (m). Titanium electrodes were used in a similar array for the high-frequency data acquisition. The orthogonal, horizontal magnetic fields in the direction of the electric-field measurement array were sensed using EMI's high magnetic permeability, mu-metal-cored induction coils. For the low frequency data, two single-station recordings of the orthogonal, horizontal components of the electric and magnetic fields and the vertical magnetic field were acquired at Global Positioning System (GPS) referenced times and were used as remote references for each other. The high frequency data were recorded as non-remote referenced single stations.

The following table lists the 51 MT station locations as recorded using a GPS during field acquisition. Coordinates are referenced to the 1866 Clarke spheroid and North American 1983 Western United States datum. Longitude and latitude format is degrees, minutes, seconds. Universal Transverse Mercator (UTM) Zone 11 South and East units are in meters. Station elevation is given in meters. The accuracy of the x, y, z component is  $\pm 5$  m.

**Table 1. Station Locations**

Stations	Latitude	Longitude	Elevation	UTM 11S North	UTM 11S East	Remote
1	36,53'51.5	116,11'50.3	1456	4083613	571518	34
2	36,54'37.5	116,10'21.7	1373	4085052	573699	None
3	36,54'23.0	116,08'57.9	1304	4084623	575799	None
4	36,54'04.6	116,07'37.5	1254	4084071	577772	16
5	36,53'27.0	116,03'46.3	1149	4082968	583504	None
6	36,53'36.9	116,02'23.8	1101	4083296	585543	36
7	36,53'52.5	116,00'47.0	1100	4083795	587935	30
8	36,54'18.2	115,59'08.6	1229	4084622	590362	None
9	36,57'36.4	116,12'18.9	1536	4090540	570753	46
10	36,58'01.6	116,11'05.3	1437	4091331	572566	47
11	36,58'44.4	116,09'53.3	1445	4092663	574335	50

12	36,59'36.6	116,08'07.0	1463	4094297	576949	49
13	36,59'25.0	116,06'52.1	1335	4093950	578802	48
14	36,59'27.5	116,05'36.6	1243	4094053	580670	48a
15	36,57'34.8	116,04'48.9	1299	4090592	581884	51
16	36,57'38.3	116,04'02.2	1236	4090710	583035	4
17	36,57'26.7	116,02'16.2	1182	4090375	585659	29
18	36,57'26.5	116,00'34.3	1186	4090400	588182	None
19	36,57'22.4	115,59'29.2	1199	4090289	589792	35
20	37,04'01.5	116,12'12.2	1528	4102410	570816	45
21	37,03'20.9	116,11'12.8	1490	4101166	572297	44
22	37,04'02.3	116,10'01.1	1438	4102458	574055	43
23	37,03'23.6	116,08'16.2	1347	4101290	576659	37
24	37,03'06.3	116,06'52.0	1306	4100781	578746	38
25	37,02'54.4	116,05'09.4	1261	4100434	581280	39
26	37,02'14.0	116,04'05.3	1240	4099202	582876	40
27	37,01'07.0	116,02'00.7	1209	4097167	585977	41
28	37,01'06.3	115,59'45.8	1210	4097185	589311	42
29	37,05'38.3	116,09'55.2	1501	4105419	574177	17
30	37,04'54.5	116,08'10.0	1367	4104092	576786	7
31	37,05'42.2	116,06'51.2	1334	4105583	578716	None
32	37,05'41.0	116,04'57.9	1270	4105571	581515	None
33	37,04'56.9	116,02'58.0	1240	4104238	584489	None
34	37,04'07.5	116,01'20.1	1241	4102745	586922	1
35	37,04'04.8	115,59'59.5	1265	4102681	588914	19
36	37,04'19.6	115,58'36.3	1327	4103157	590961	6
37	37,08'26.4	116,08'34.4	1489	4110620	576125	23
38	37,08'16.7	116,06'16.5	1331	4110353	579528	24
39	37,07'46.8	116,04'18.5	1292	4109457	582448	25
40	37,07'23.2	116,02'24.8	1275	4108755	585262	26
41	37,07'06.8	116,01'19.1	1317	4108275	586891	27
42	37,06'45.2	115,59'55.7	1373	4107623	588955	28
<b>43m</b>	37,10'03.5	116,08'33.9	1531	4113609	576110	22
<b>44m</b>	37,10'07.6	116,08'00.0	1486	4113742	576943	21
<b>45m</b>	37,13'13.1	116,08'41.3	1612	4119451	575875	20
<b>46m</b>	37,12'25.4	116,07'13.2	1564	4118000	578059	9
<b>47m</b>	37,13'35.5	116,04'19.3	1575	4120201	582325	10
<b>48m</b>	37,13'50.6	116,03'39.5	1560	4120677	583300	13
<b>49m</b>	37,13'54.7	116,02'25.7	1486	4120819	585119	12
<b>50m</b>	37,13'12.2	116,03'52.7	1536	4119490	582990	11
<b>51m</b>	37,11'50.5	116,02'44.8	1356	4116992	584688	15

### Magnetotelluric Data

The recorded time-series data were transformed to the frequency domain and processed to determine a 2-D apparent resistivity and phase tensor at each site. Rotation of the impedance tensor allows for decoupling into the TE and TM modes. During the analysis and interpretation process, each station is

rotated to a fixed angle determined by the given nominal profile orientation. The data provided here have not been rotated from the original north-south, east-west acquisition orientation. Low frequency time series data were edited, and cross-power files were created with Egbert's (1997) multiple-station, magnetotelluric data-processing algorithms using remote references. Cross-power files were sorted to select optimal signal-to-noise time-series data sets (see Appendix at the back of this report).

The effects of near-surface resistivity anomalies can cause what are known as "static shifts" in the data (Sternberg and others, 1988). There were no significant static shifts in these data. Cultural features also can affect the measured magnetotelluric responses. These include fences, pipelines, communication lines, railways, and other manmade conductors.

The figures in the Appendix represent the field-processed MT data for each station (shown in **boldface** type in the table above) after the time-series data were converted to the frequency domain, and the tensor-transfer function was developed.

For each station, nine separate plots are given:

1. Apparent Resistivity(x and y symbols are  $xy$  and  $yx$  components)
2. Impedance Phase (x and y symbols are  $xy$  and  $yx$  components)
3. Rotation Angle
4. Impedance Skew
5. Multiple Coherency(x and y symbols are  $xy$  and  $yx$  components)
6. Impedance Polar Plots
7. Tipper Magnitude
8. Tipper Strike
9.  $HzHx$  (x symbol) and  $HzHy$  (o symbol) Coherency

Error bars (], [) on the Apparent Resistivity, Impedance Phase, Skew, Tipper Magnitude, and Tipper Strike plots represent probable errors within one standard deviation of the sample variance (Gamble and others, 1979).

Apparent resistivity is the approximate ratio of the electric-field strength to the magnetic-field strength at a given frequency. The impedance phase is proportional to the slope of the apparent resistivity curve on a log-log plot, but from baselines at  $\pm 45$  degrees (Vozoff, 1991). A measure of the dimensionality for MT data is provided by the impedance skew of the impedance tensor (Vozoff, 1972). If the effective measured resistivity response to the geology beneath a MT station truly is one or two dimensional, then the skew will be zero. Instrument and environmental sources of electrical noise can cause non-zero skew values. Skew values typically are small (about 0.1) for relatively low-noise recordings. Higher skews (above 0.2) are an indication of either the resistivity response to 3-D geology or higher levels of noise. Manmade electrical noise, such as power lines, power generators, and moving vehicles and trains, can have

a negative effect on MT data quality. All of these local disturbances can produce incoherent noise that mainly affects frequencies above 1 Hz. Other manmade electrical noise, such as direct current electric trains and active cathodic protection of pipelines, produces coherent electromagnetic signals that mainly affect frequencies below 1 Hz.

In the survey area, noise from a number of small power lines and small moving vehicles was negligible at distances greater than 0.4 km from the noise source. Power-line signal levels were measured at each site and typically were less than 20 percent of the maximum recordable signals. Noise from larger power lines, power generators, pipelines, and trains was negligible at distances greater than 5 km. Local lightning, wind, and rainstorms also can degrade data quality. Burying the magnetic induction coils and the electric dipole wires minimized wind noise.

Predicted values of the electric field can be computed from the measured values of the magnetic field (Vozoff, 1991). The coherence of the predicted electric field with the measured electric field is a measure of the signal-to-noise ratio provided in the multiple coherency plots. Values are normalized between 0 and 1; values at 0.5 signify signal levels equal to noise levels. For this data set, coherencies generally were at an acceptable level, except at times in the frequency ranges of 0.01 to 5Hz (often referred to as the "dead band").

The field-processed MT data include some scatter and poor signal-to-noise ratios. Spectral results were inspected visually for noisy data, and the best signal-to-noise field data were combined into the final plots.

The magnetotelluric impedance polar plots provide a measure of MT data dimensionality (Reddy and others, 1977). For 1-D resistivity structures, the principal impedance polar diagram (dashed line) is a circle. For 2-D or 3-D resistivity structures, the principal impedance polar diagram (dashed line) elongates either parallel or perpendicular to strike direction. Over resistors, the principal impedance polar diagram elongates perpendicular to strike direction, and over conductors, it elongates parallel to strike direction. For 2-D resistivity structures, the additional impedance polar diagram (solid line) attains the shape of a symmetric clover leaf. For 3-D resistivity structures, the additional impedance polar diagram (solid line) elongates in one direction, and its amplitude is comparable to that of the principal impedance polar diagram (dashed line).

The magnetotelluric "tipper" is calculated from the vertical component of the magnetic field. The tipper magnitude is a measure of the "tipping" of the magnetic field out of the horizontal plane (Vozoff, 1991). It will be equal to zero for the 1-D case. It typically increases to values between 0.1 to 0.5 and seldom approaches 1, as it responds primarily to vertical

and subvertical structures. The tipper magnitude of the stations discussed in this report ranged from 0.1 to 0.6 over the lower frequencies, indicating some vertical structure at depth. The tipper strike is used to help resolve the 90-degree ambiguity in the impedance rotation angle. The HzHx and HzHy coherency is a measure of the signal-to-noise ratio of the vertical magnetic field with respect to each of the orthogonal, horizontal magnetic-field directions. Values are normalized between 0 and 1; values at 0.5 signify signal levels equal to noise levels. These three-component magnetic-field coherencies provide a check on the signal-to-noise ratio of the measured values in the tipper magnitude and tipper strike plots.

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## **Appendix**

### **Magnetotelluric Data Plots**

There are nine separate plots for each station:

1. Apparent Resistivity for the rotated maximum (x symbol) and minimum (o symbol) modes
2. Impedance Phase for the rotated maximum (x symbol) and minimum (o symbol) modes
3. Rotation Angle for the impedance tensor (corresponds to the direction of maximum apparent resistivity)
4. Impedance Skew for the impedance tensor
5. Multiple Coherency for the rotated maximum (x symbol) and minimum (o symbol) modes of the electric field
6. Impedance Polar Plots (at 12 selected frequencies)
7. Tipper Magnitude for the vertical magnetic field
8. Tipper Strike for the vertical magnetic field
9. HzHx (x symbol) and HzHy (o symbol) Coherency

Refer to the "Magnetotelluric Data" section in this report for an explanation of these plots. The "priorities" listed on the plots were determined prior to data acquisition. During post-processing the priority ranking was changed.

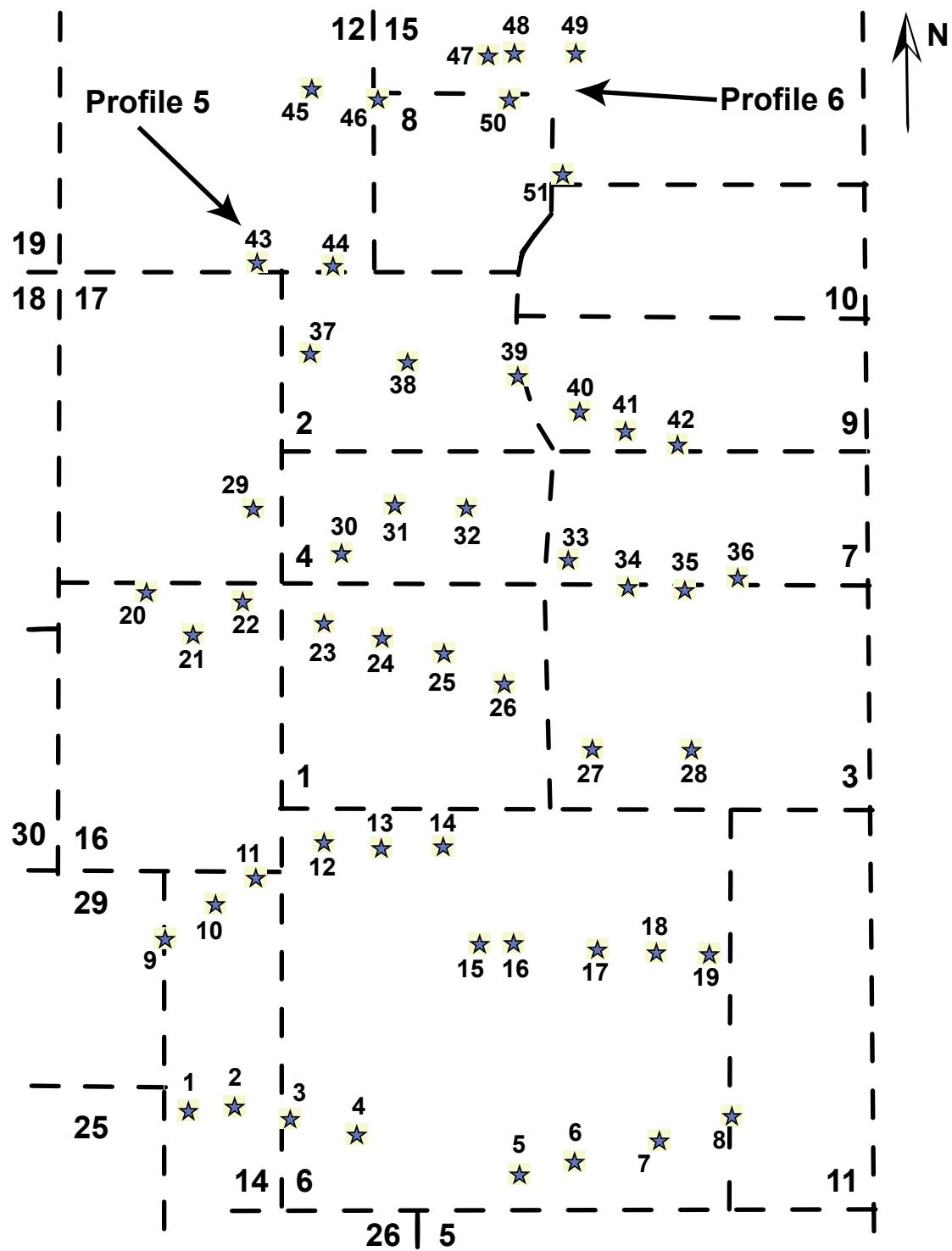
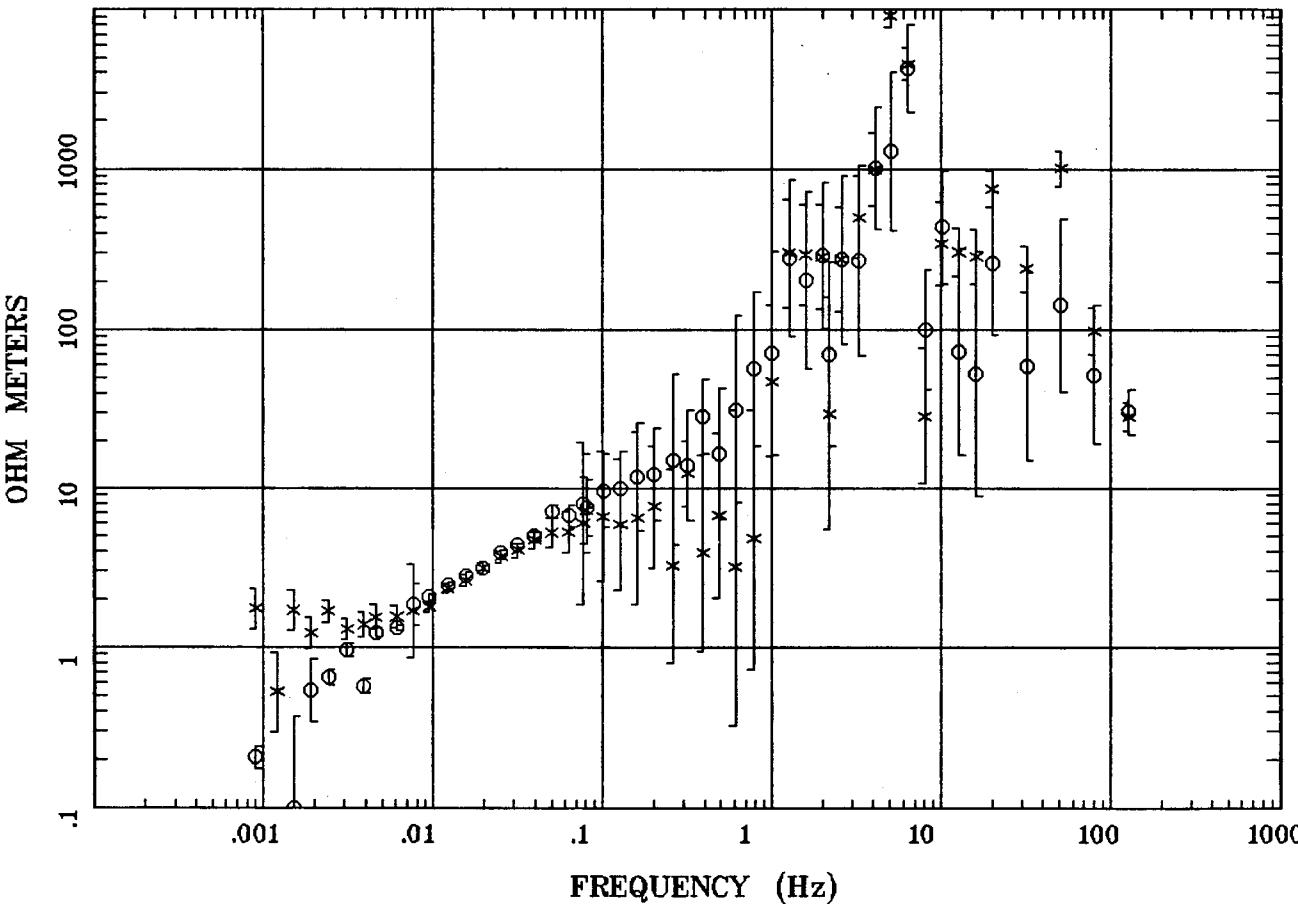


Figure 1. Index map showing magnetotelluric (MT) stations in and near Yucca Flat, Nevada. MT stations acquired in 2003 are numbered stars 1-51. Dashed lines are Nevada Test Site Areas 1-30.

## APPARENT RESISTIVITY



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

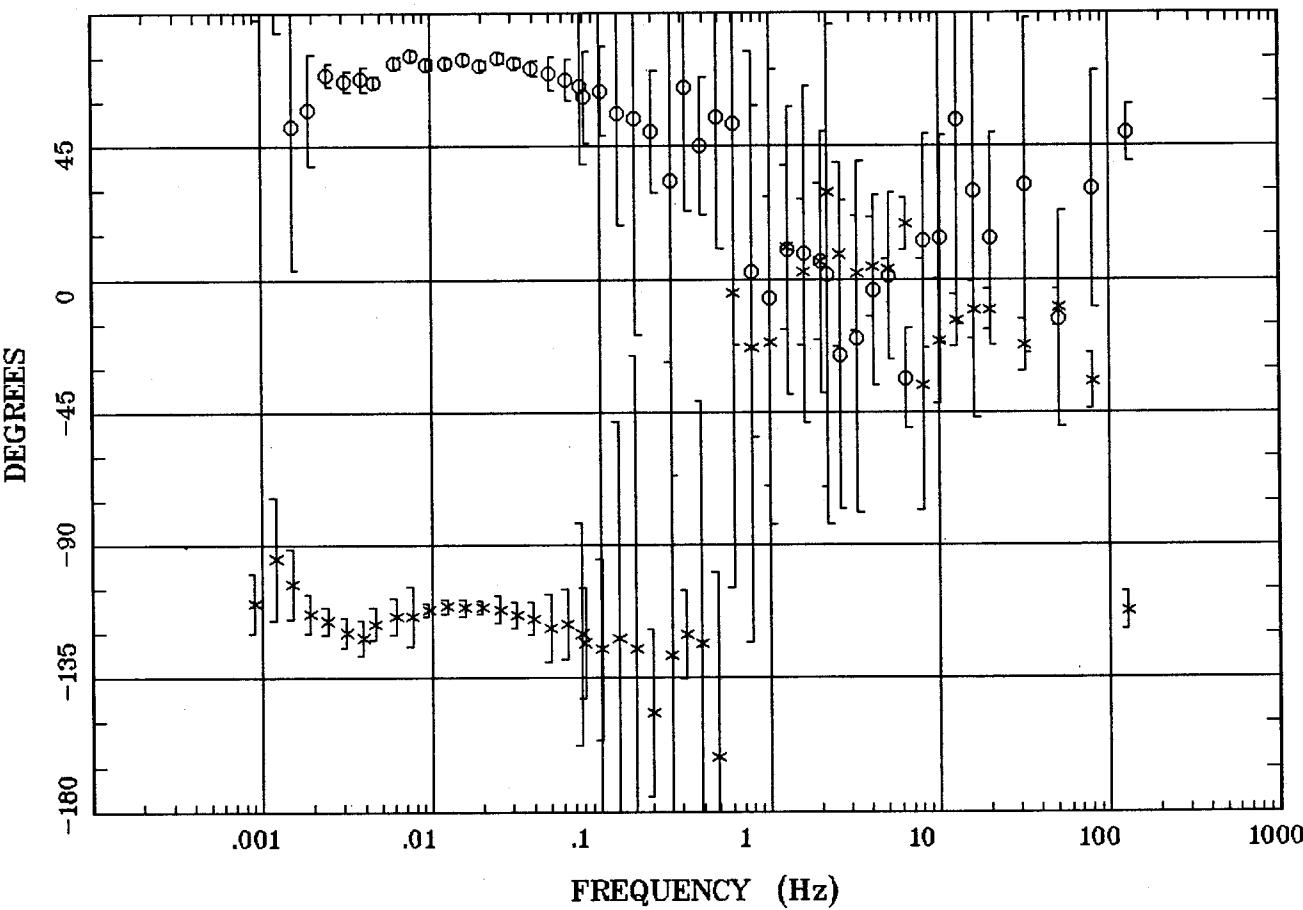
Filename: s43r22.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:09 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## IMPEDANCE PHASE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

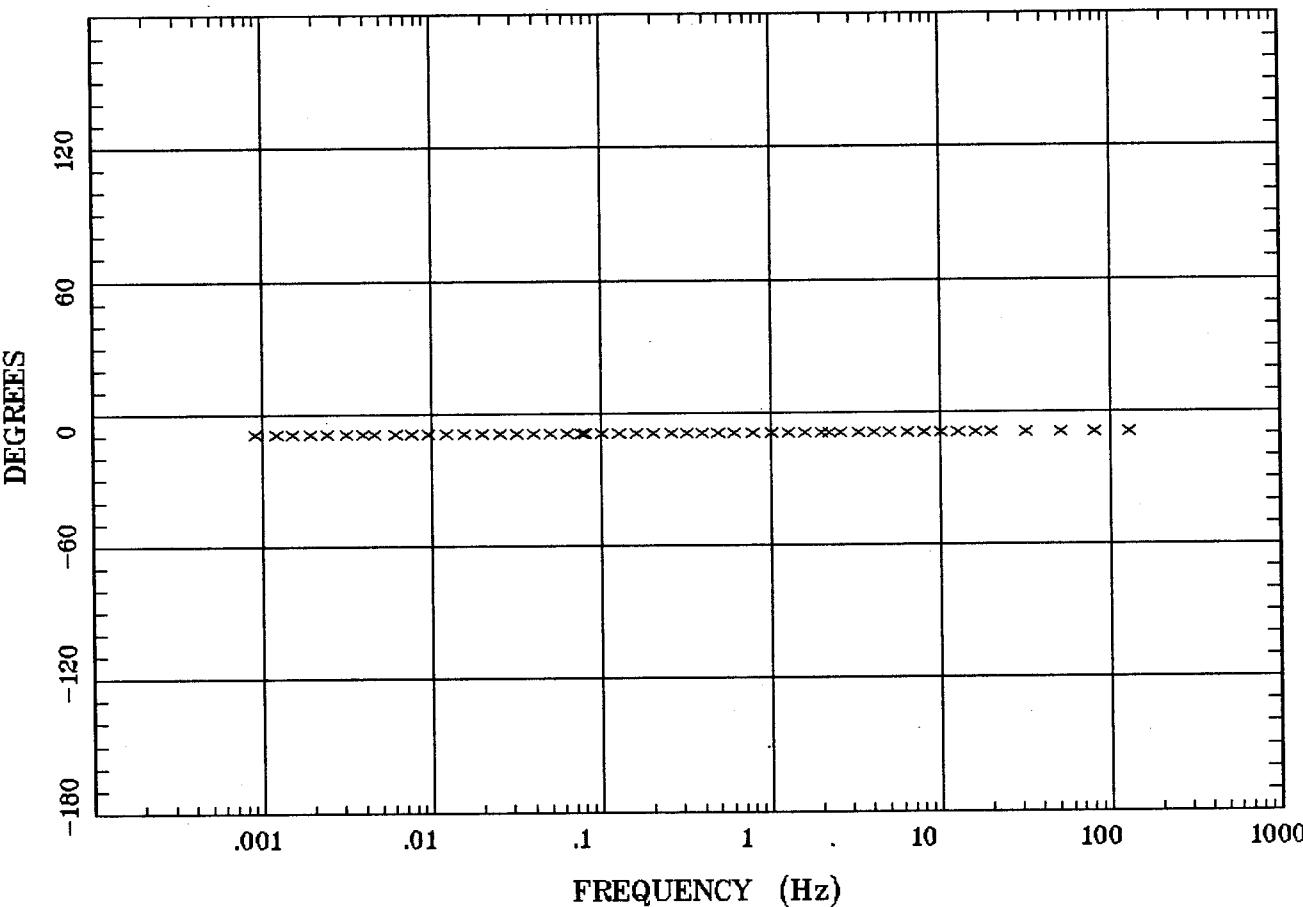
Filename: s43r22.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:09 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## ROTATION ANGLE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

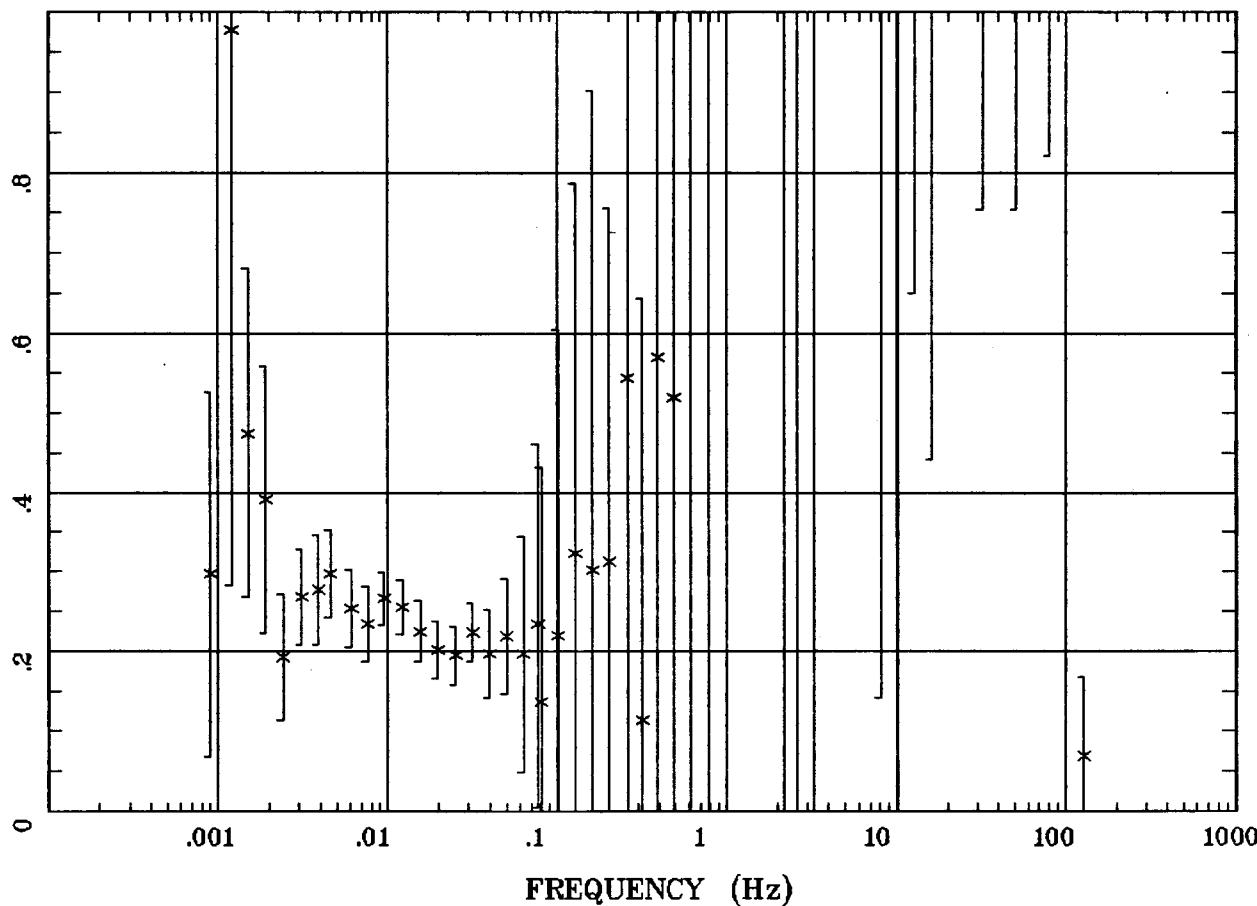
Filename: s43r22.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:09 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## IMPEDANCE SKEW

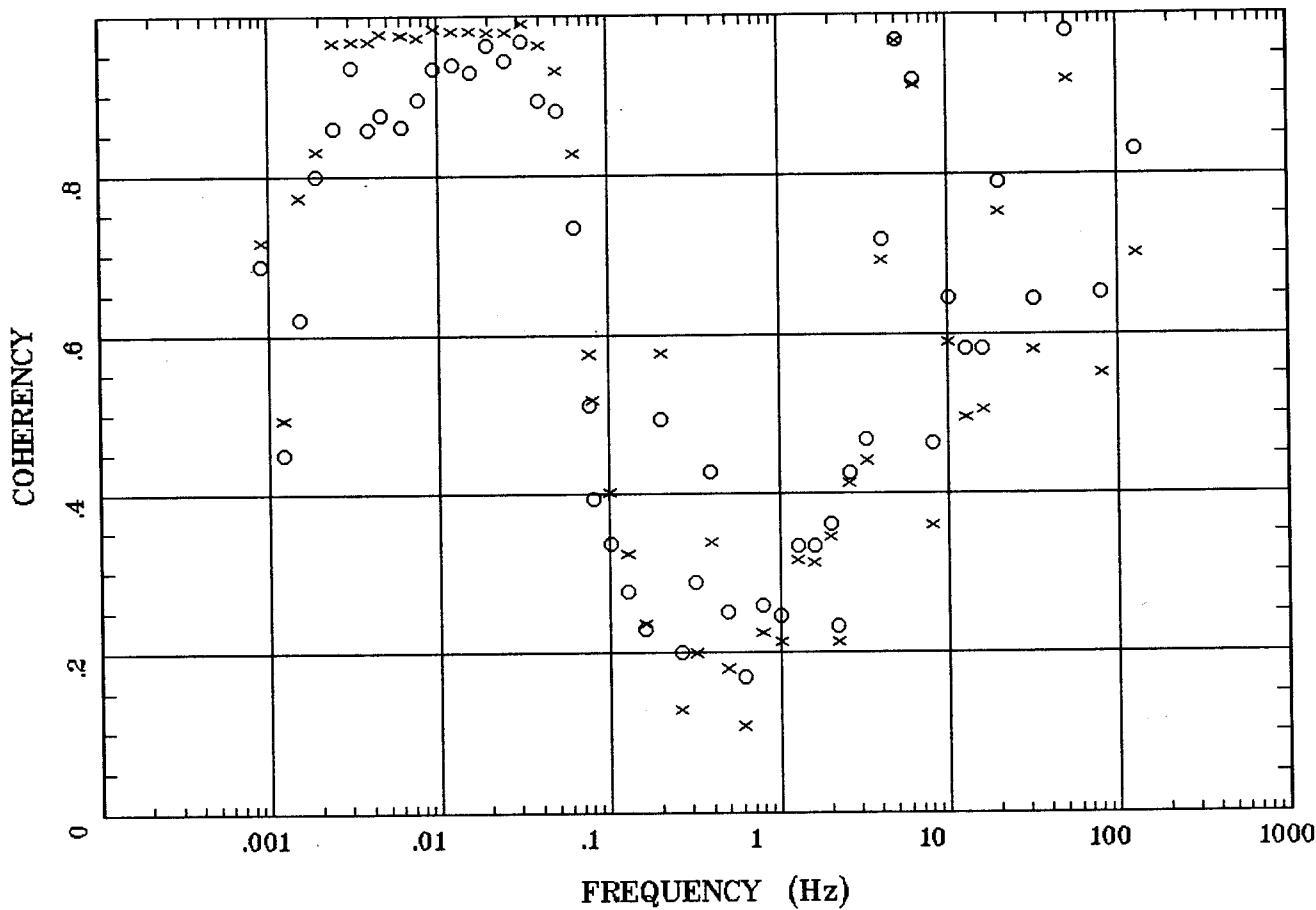


Client:  
Remote:  
Acquired: 19:5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s43r22.a02  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 13:09 Dec 08, 2004  
< EMI - ElectroMagnetic Instruments >

# Station 43

E MULT Coh.



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

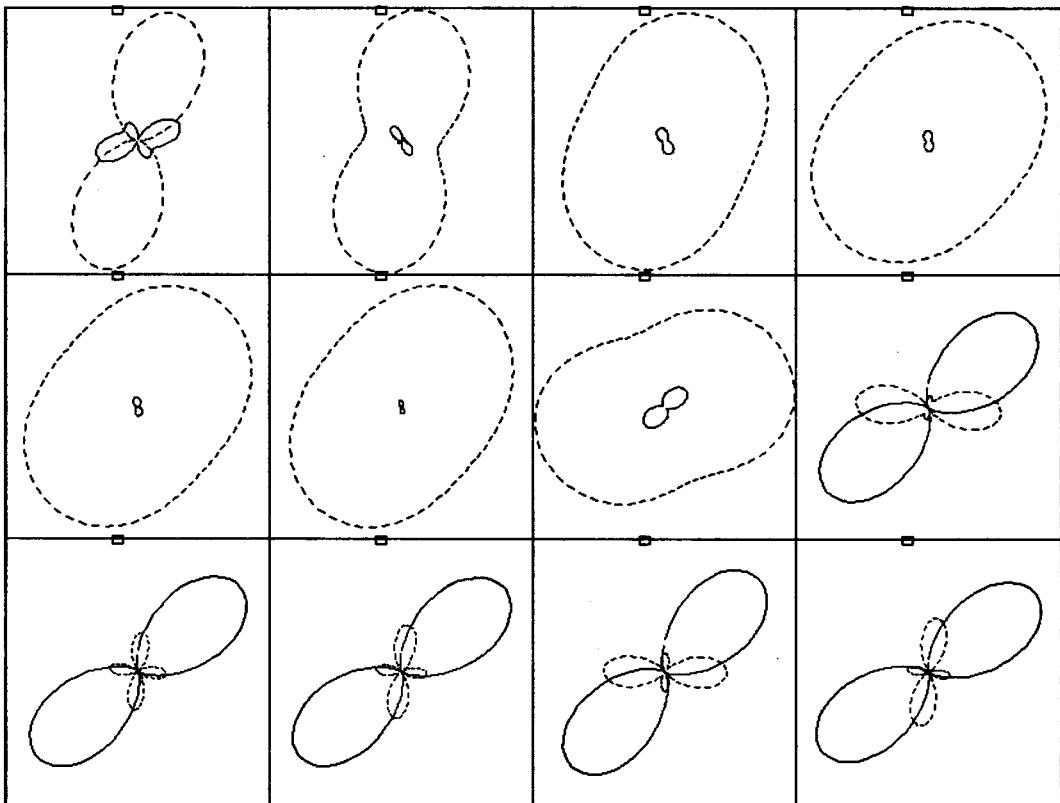
Filename: s43r22.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:09 Dec 08, 2004

< EMI - ElectroMagnetic Instruments >

## POLAR PLOTS



.0009 Hz  
.0397 Hz  
1.587 Hz

.0024 Hz  
.0802 Hz  
3.296 Hz

.0061 Hz  
.202 Hz  
8.057 Hz

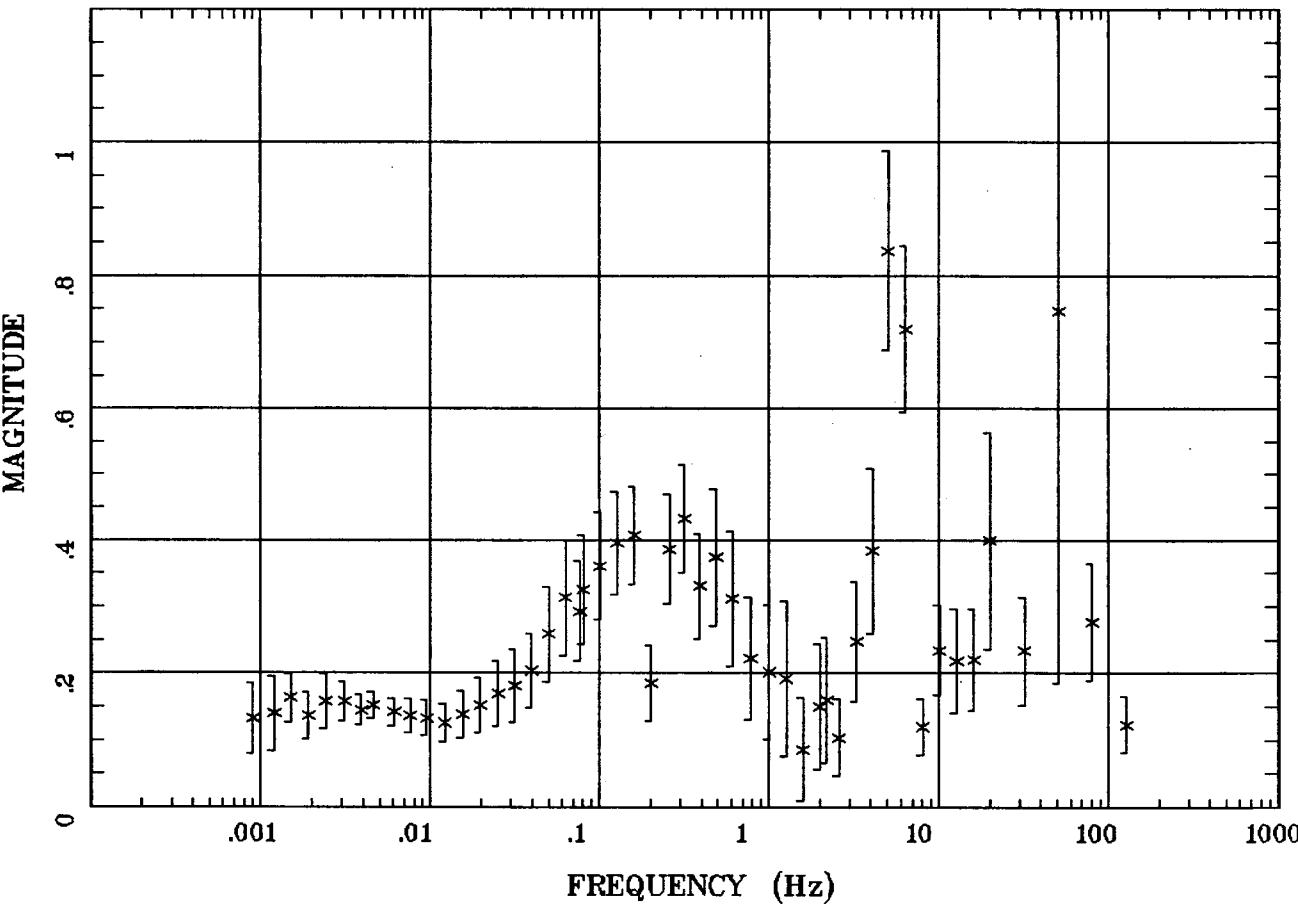
.0156 Hz  
.610 Hz  
20.020 Hz

Client:  
Remote:  
Acquired: 19:5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s43r22.a02  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 13:10 Dec 08, 2004  
< EMI - ElectroMagnetic Instruments >

## TIPPER MAGNITUDE

19



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

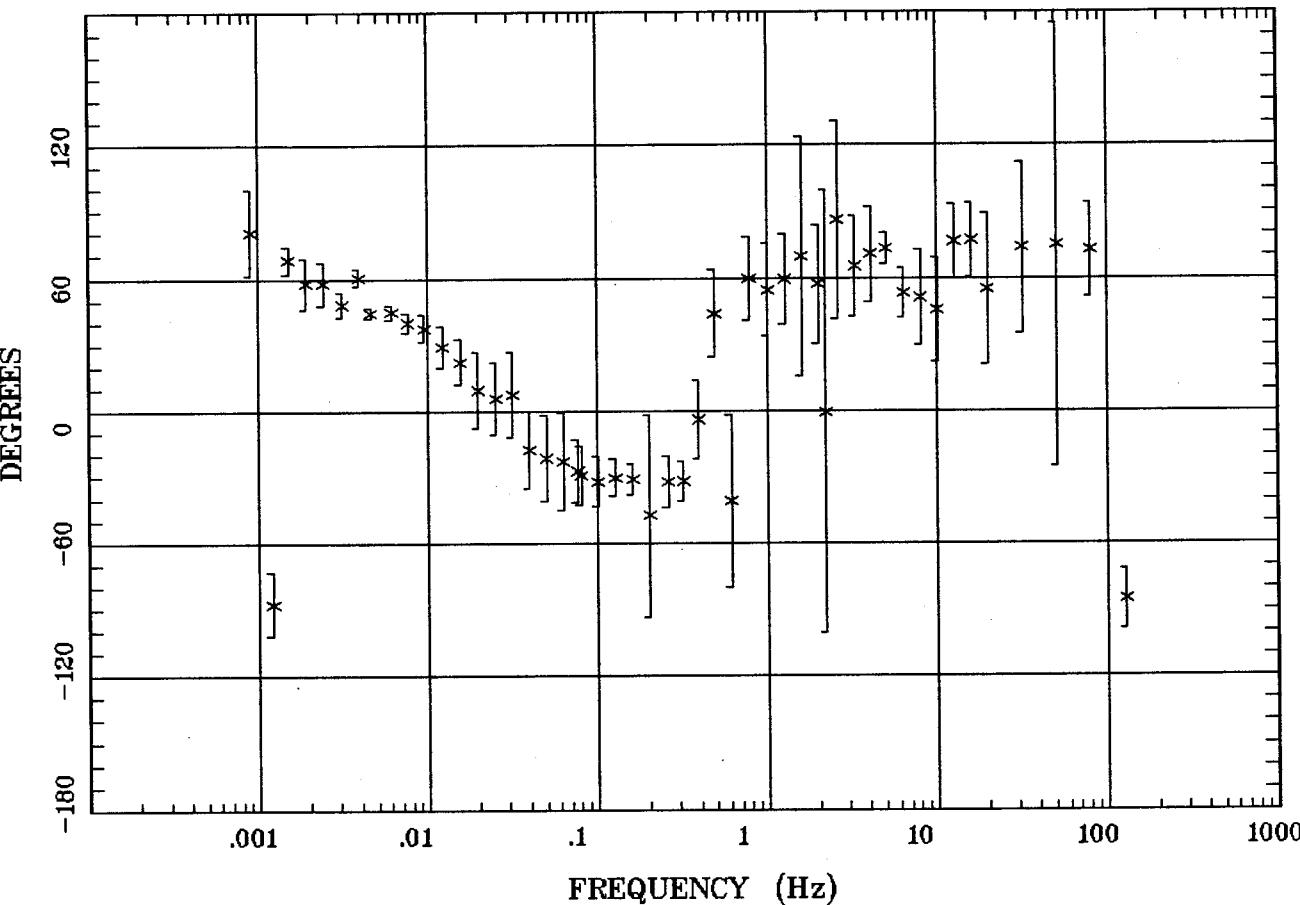
Filename: s43r22.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:10 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## TIPPER STRIKE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

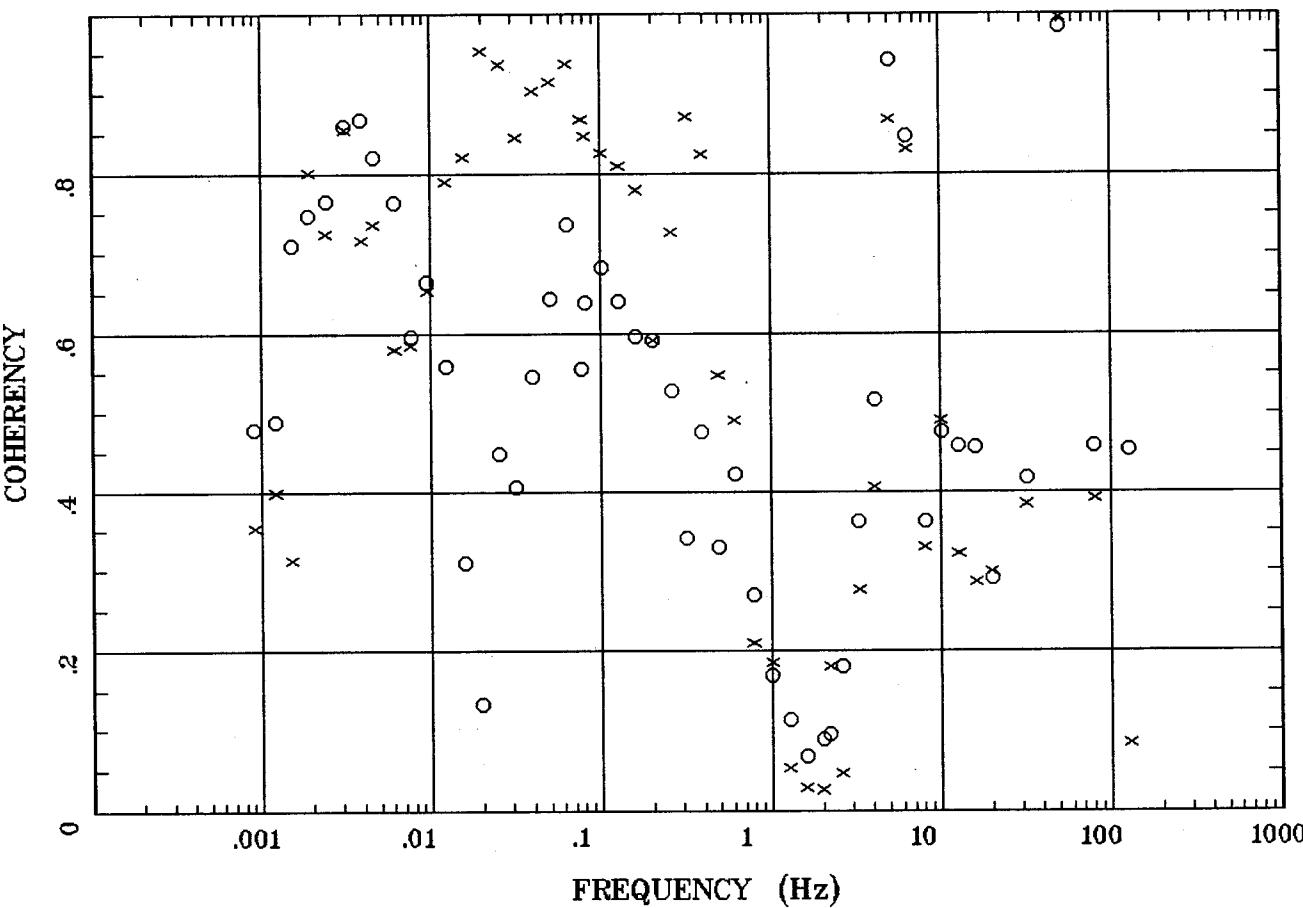
Filename: s43r22.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:10 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

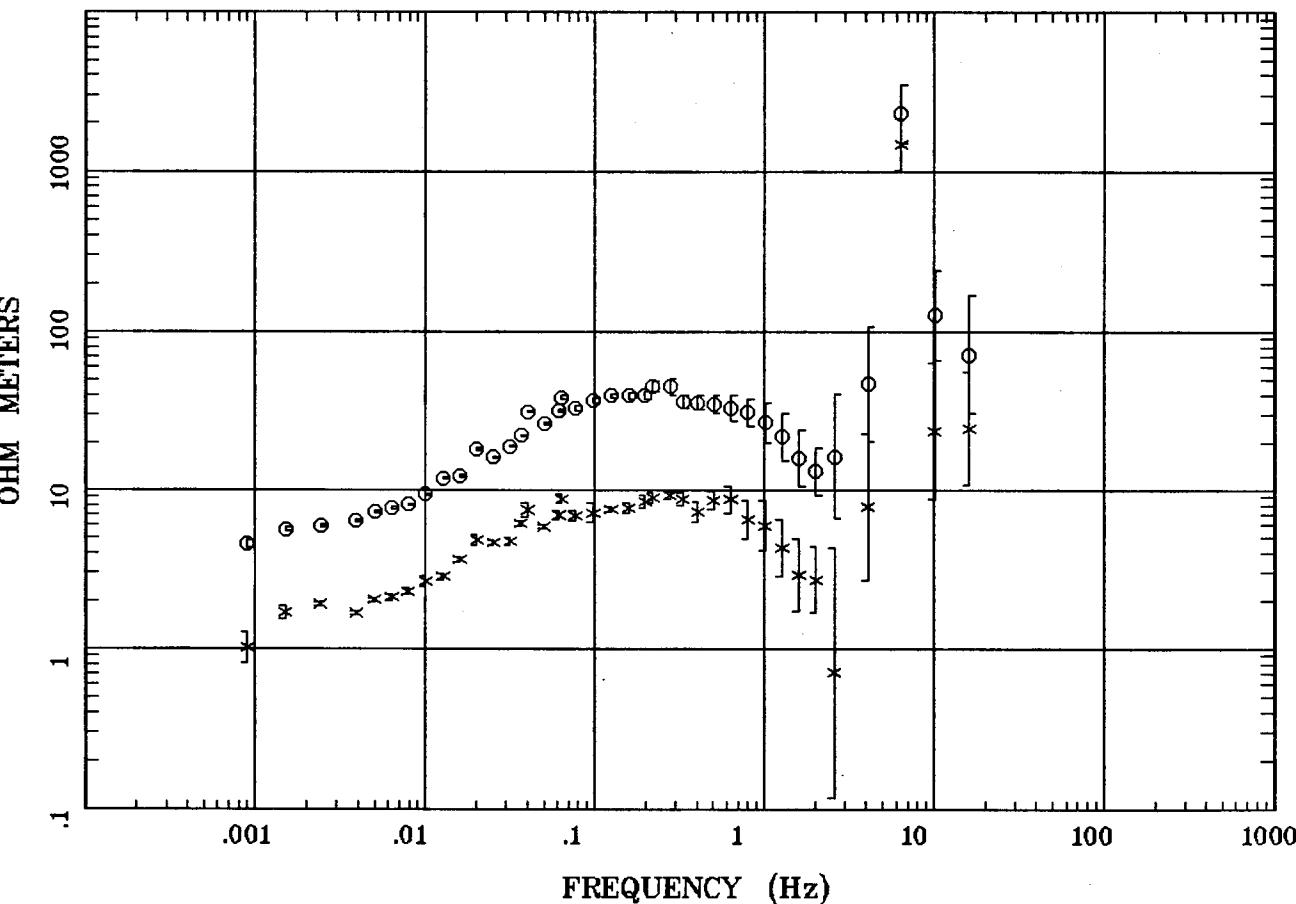
HzHx.x Coh HzHy.o



Client:  
 Remote:  
 Acquired: 19:5 Mar 08, 1998  
 Survey Co:

Rotation:  
 Filename: s43r22.a02  
 Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
 Plotted: 13:10 Dec 08, 2004  
 < EMI - ElectroMagnetic Instruments >

## APPARENT RESISTIVITY



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

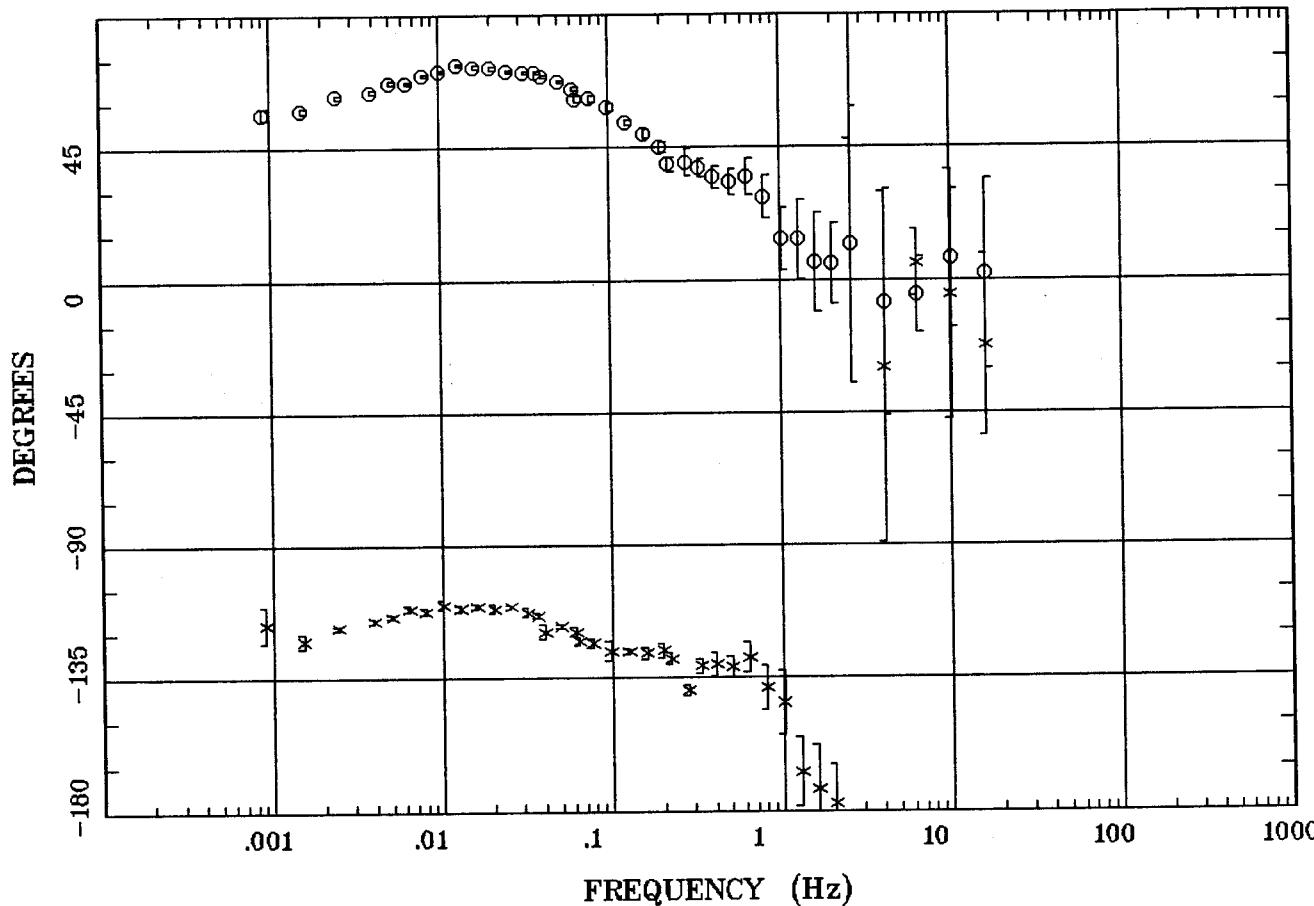
Filename: s44r21.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:10 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## IMPEDANCE PHASE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

Filename: s44r21.a02

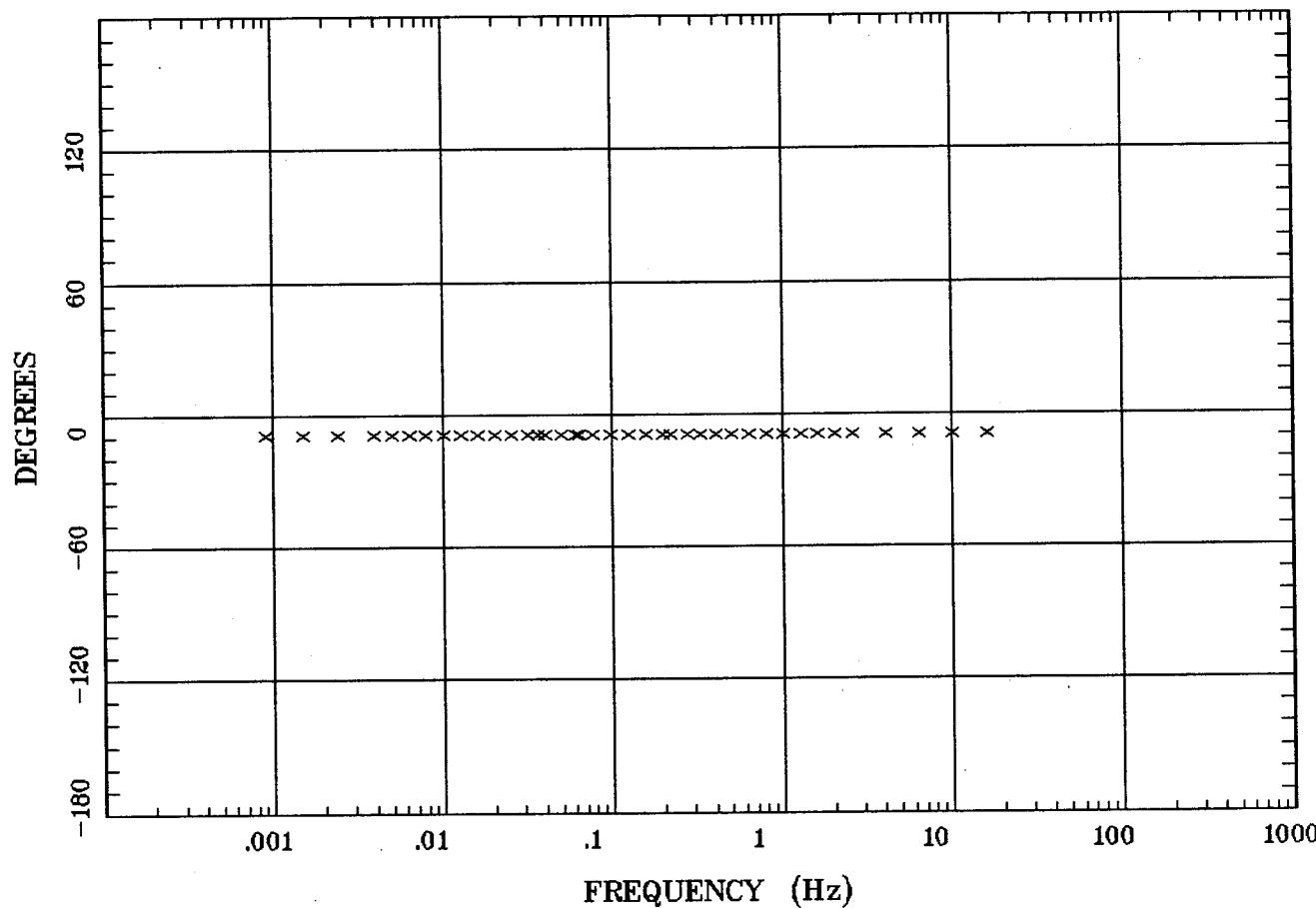
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:10 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

Station 44

ROTATION ANGLE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

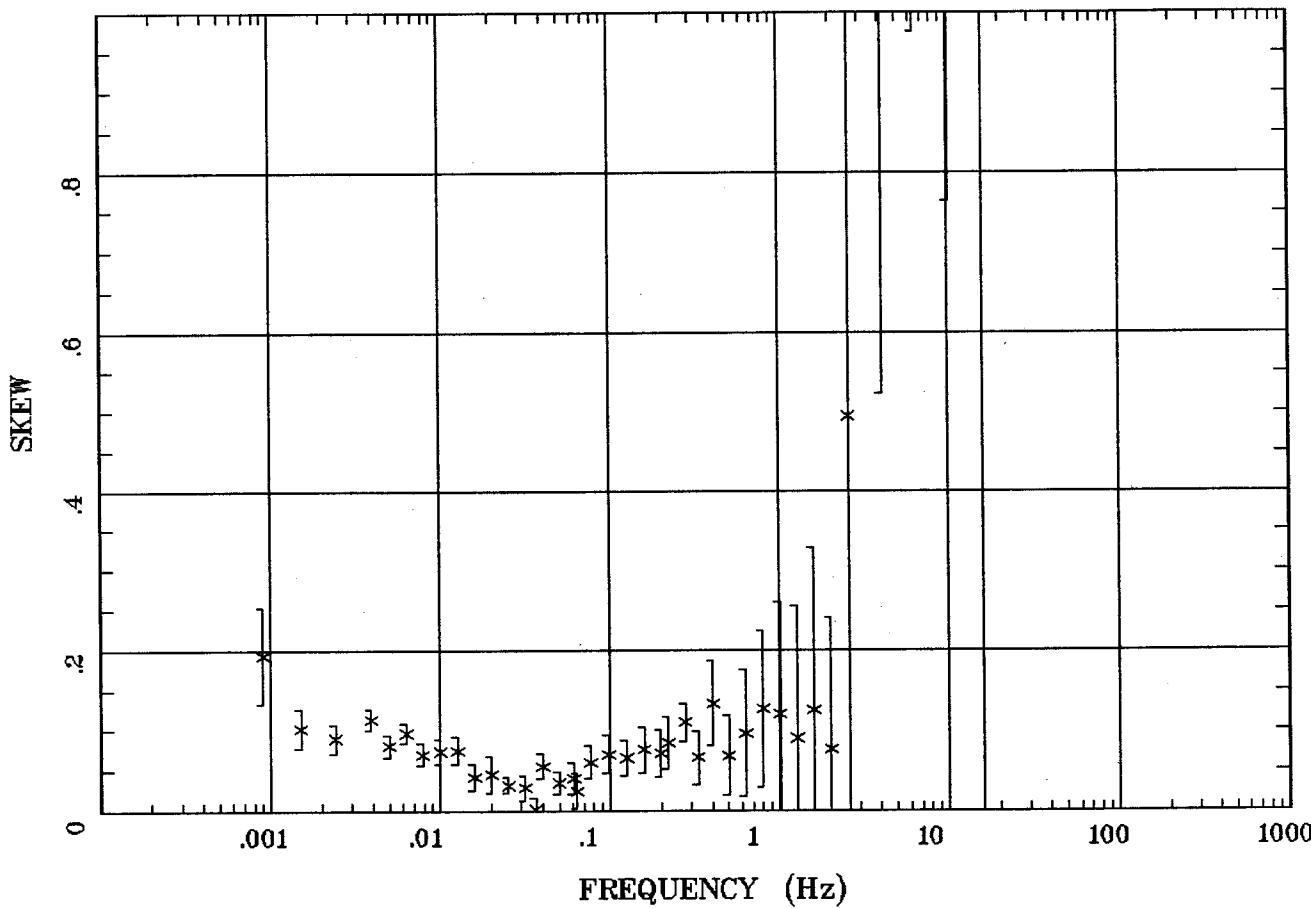
Filename: s44r21.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:10 Dec 08, 2004

< EMI - ElectroMagnetic Instruments >

## IMPEDANCE SKEW



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

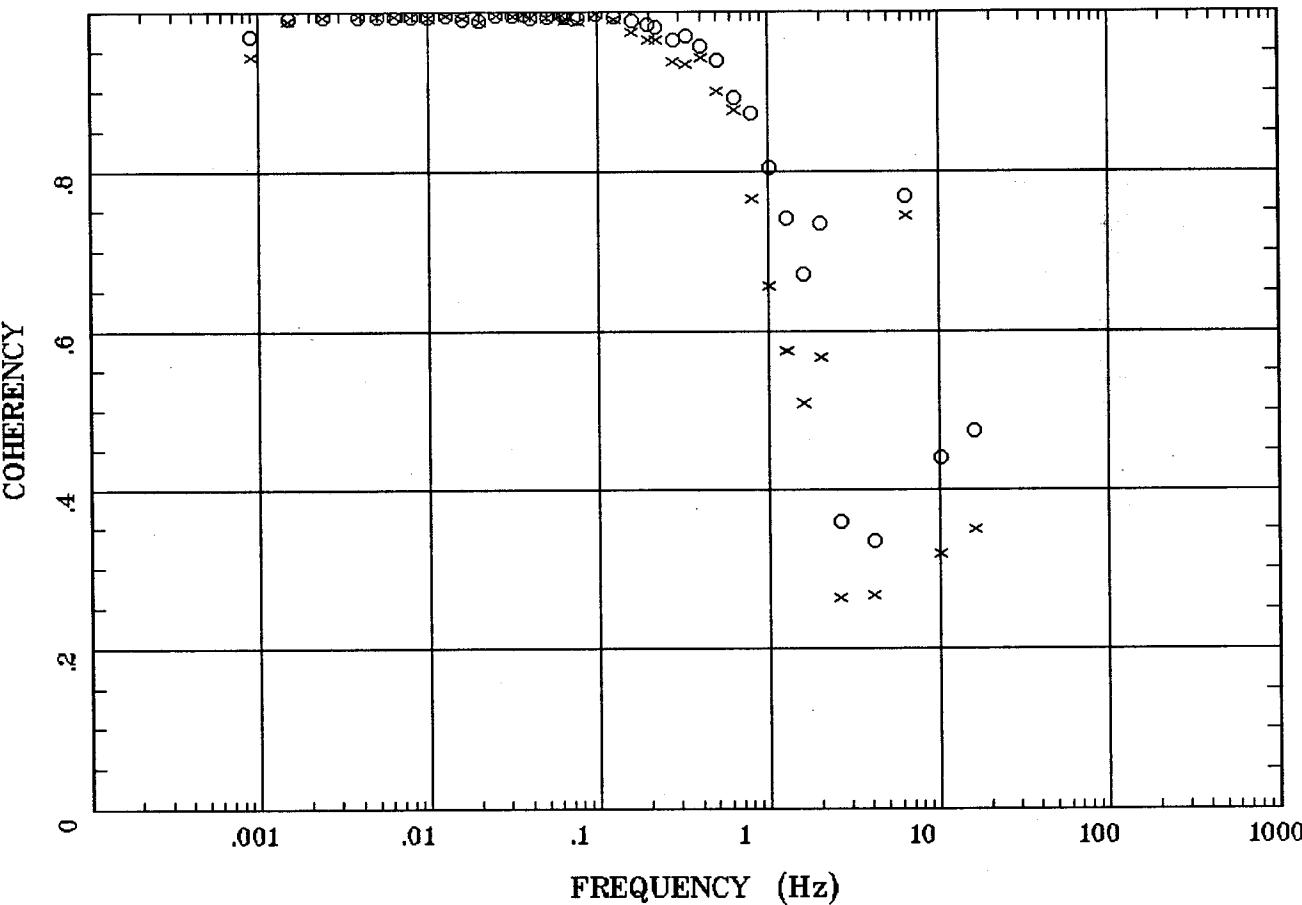
Filename: s44r21.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:10 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## E MULT Coh.



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

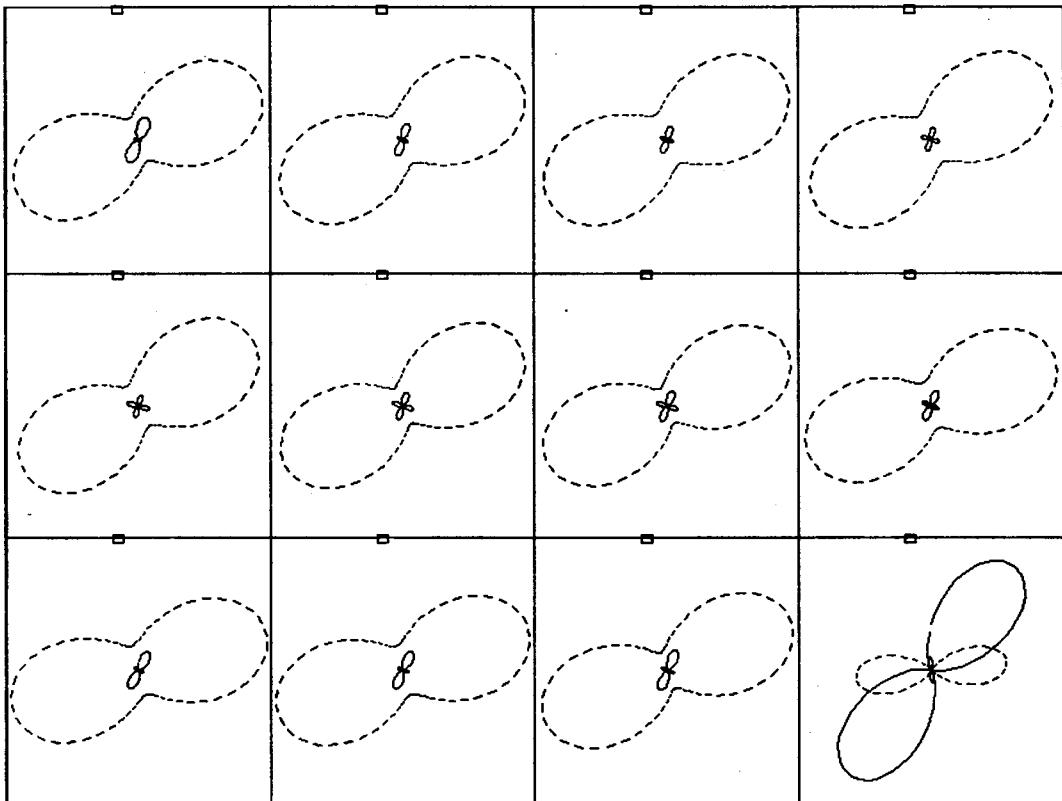
Filename: s44r21.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:10 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## POLAR PLOTS



.0009 Hz  
.0366 Hz  
.406 Hz

.0039 Hz  
.0610 Hz  
.800 Hz

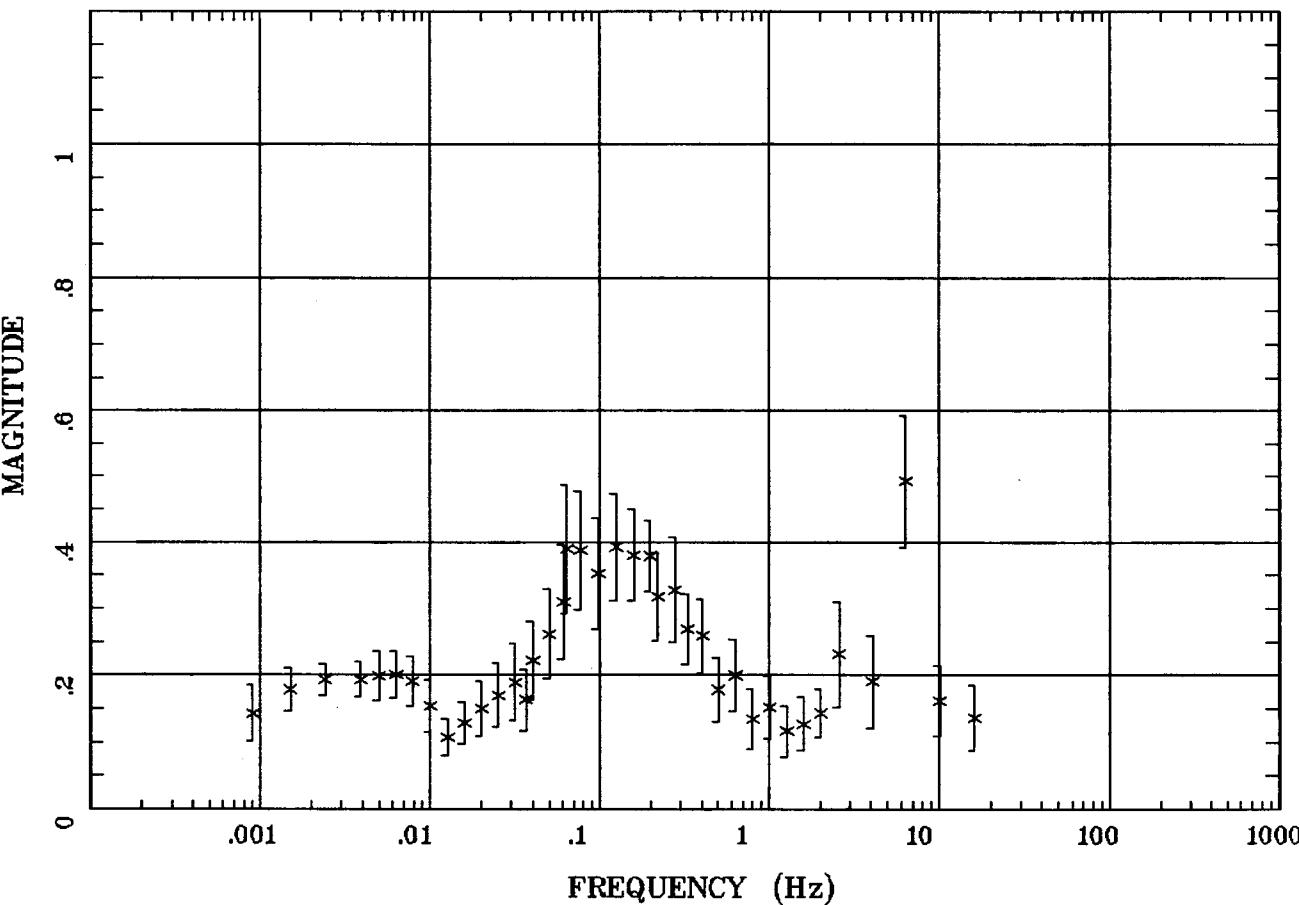
.0079 Hz  
.0977 Hz  
1.602 Hz

.0159 Hz  
.198 Hz  
4.077 Hz

Client:  
Remote:  
Acquired: 19:5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s44r21.a02  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 13:10 Dec 08, 2004  
< EMI - ElectroMagnetic Instruments >

## TIPPER MAGNITUDE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

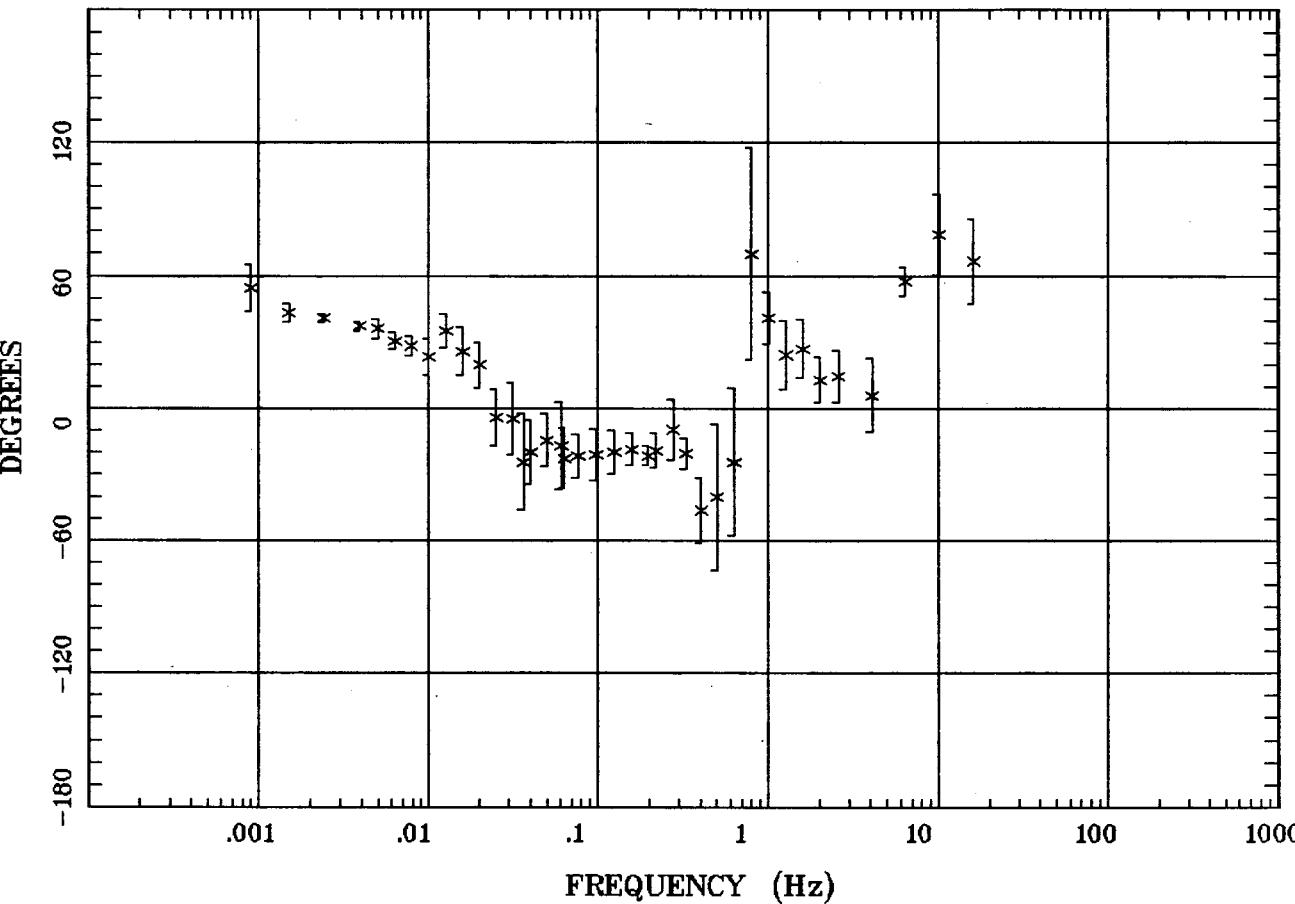
Filename: s44r21.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:10 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

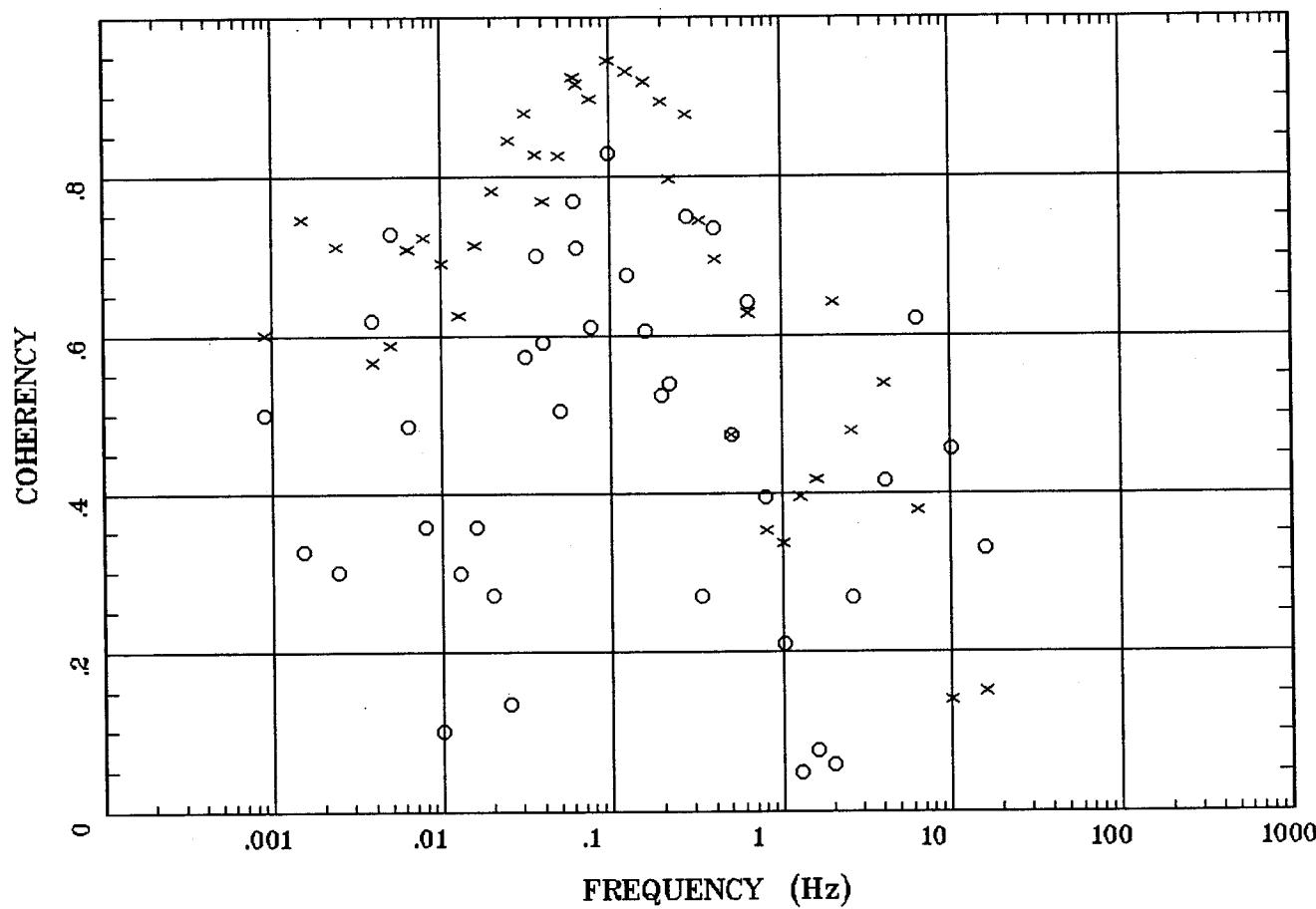
## TIPPER STRIKE



Client:  
Remote:  
Acquired: 19:5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s44r21.a02  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 13:10 Dec 08, 2004  
< EMI - ElectroMagnetic Instruments >

HzHx.x Coh HzHy.o



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

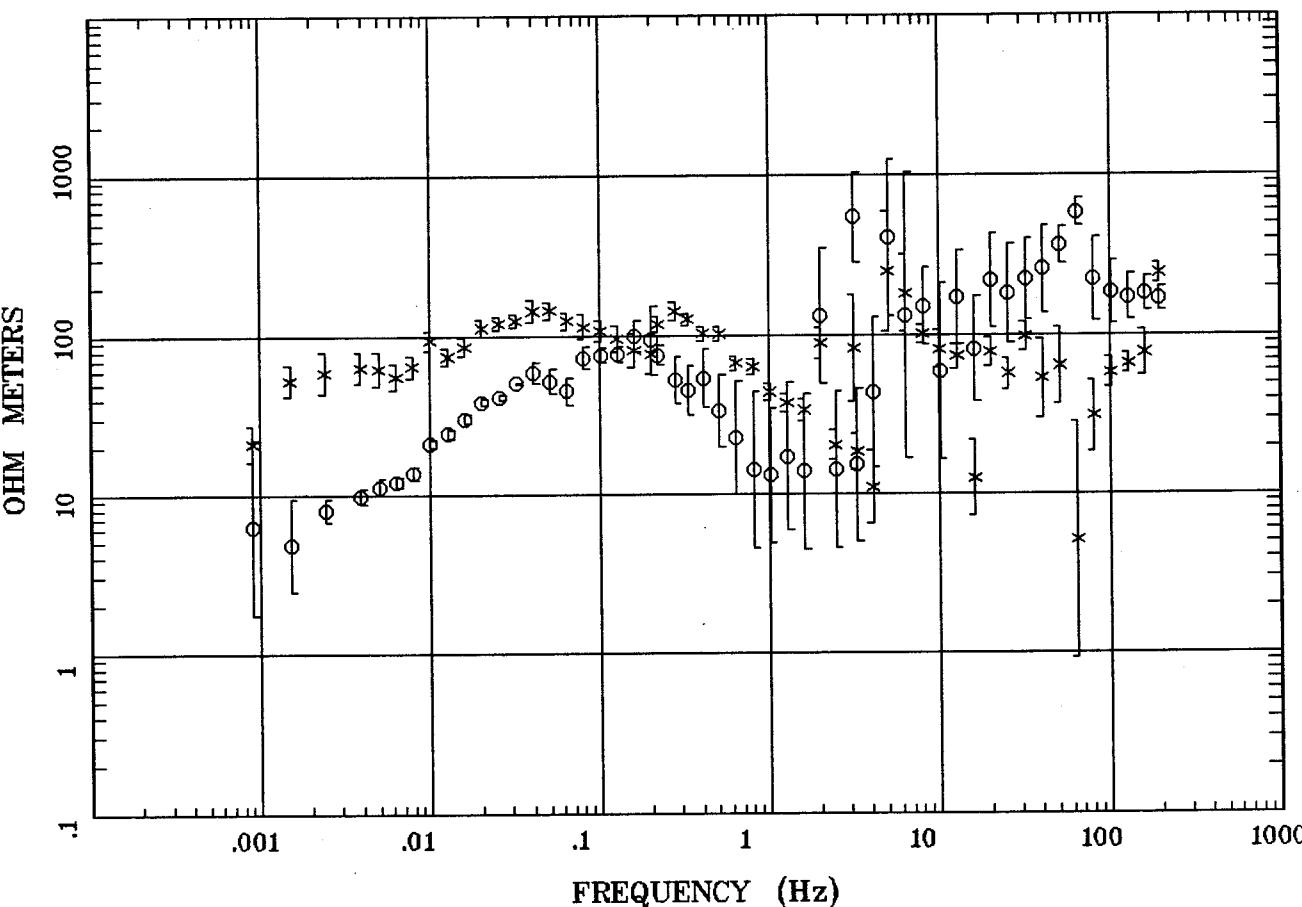
Filename: s44r21.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:10 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## APPARENT RESISTIVITY



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

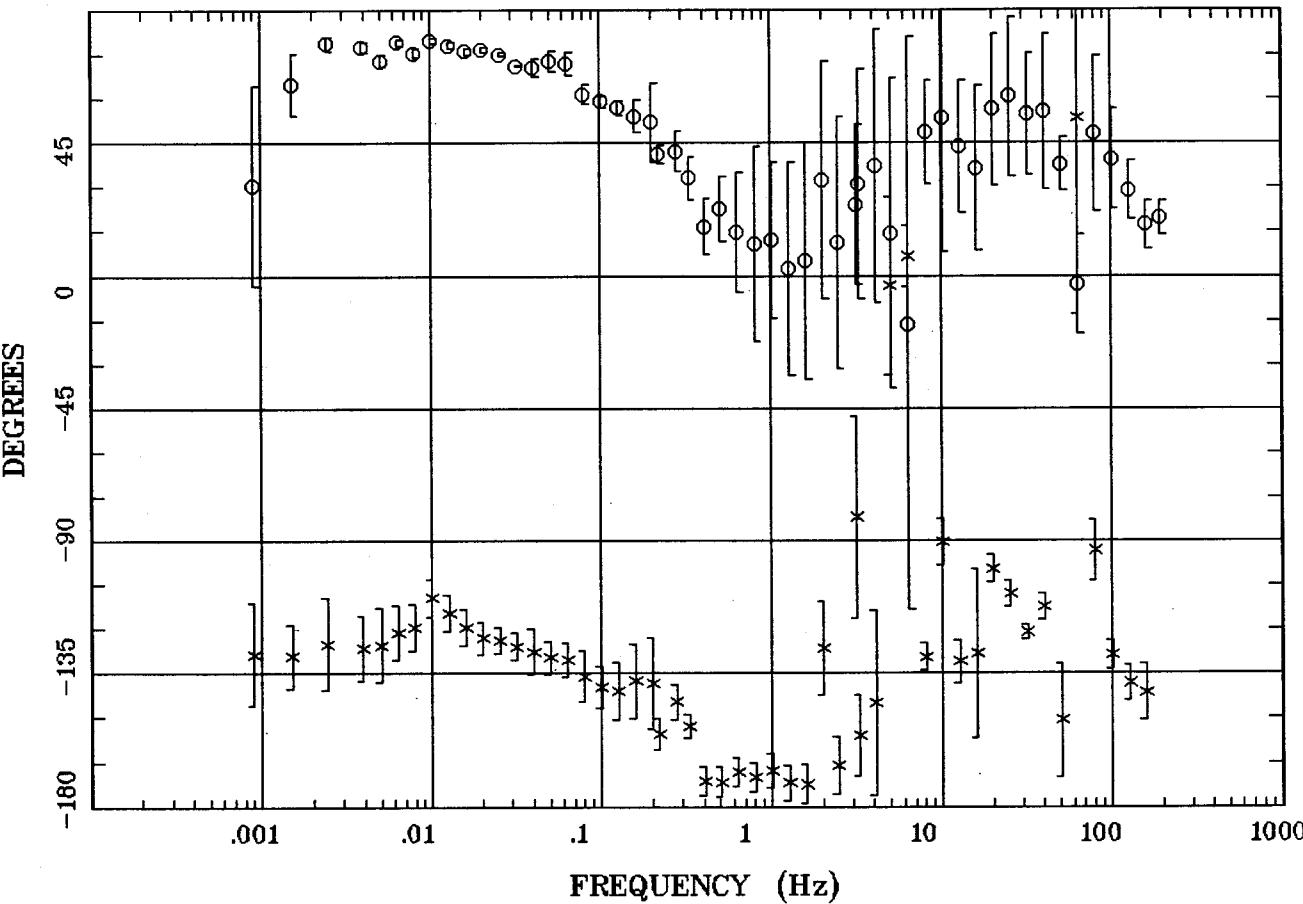
Filename: s45r20.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:11 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## IMPEDANCE PHASE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

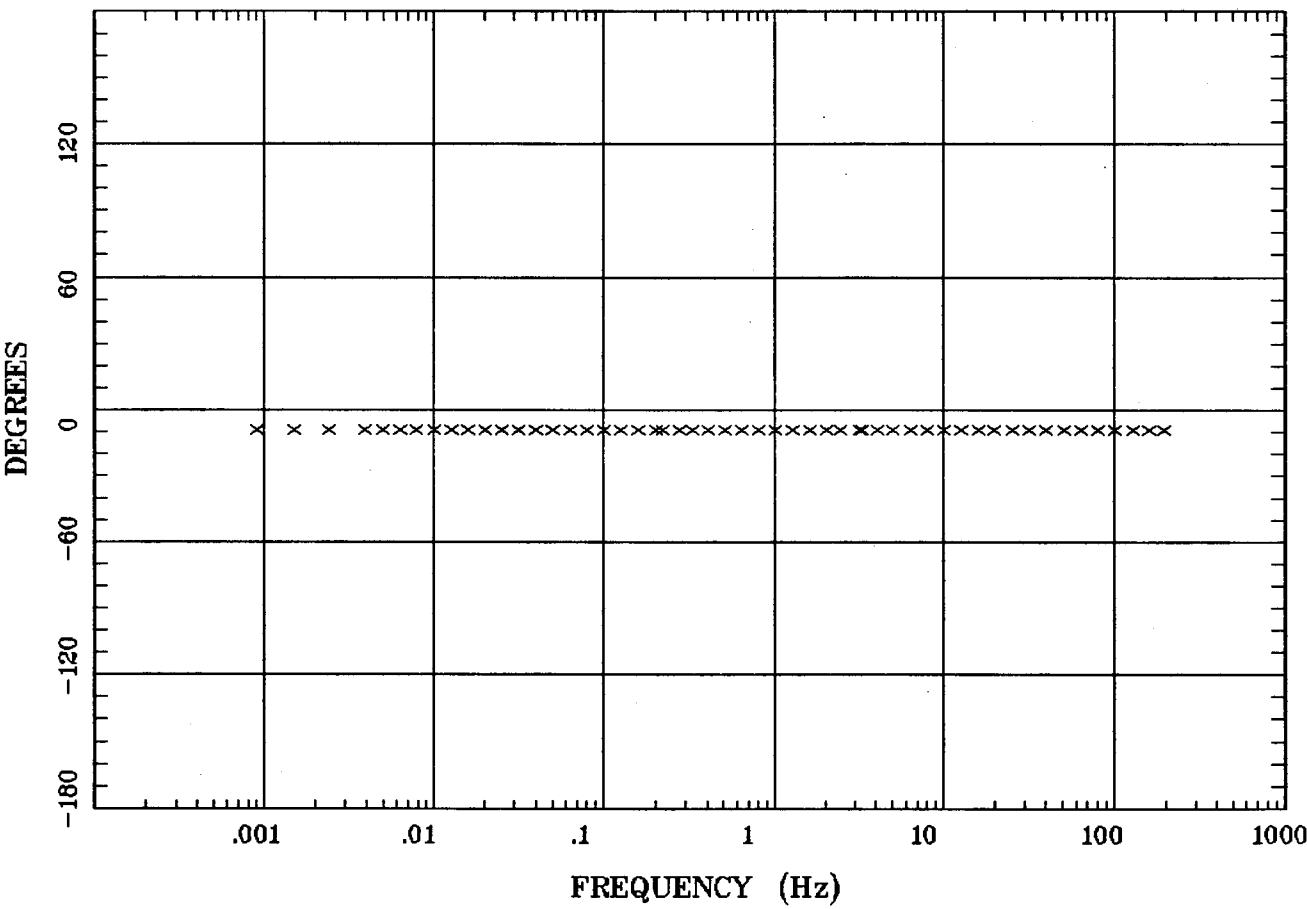
Filename: s45r20.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:11 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

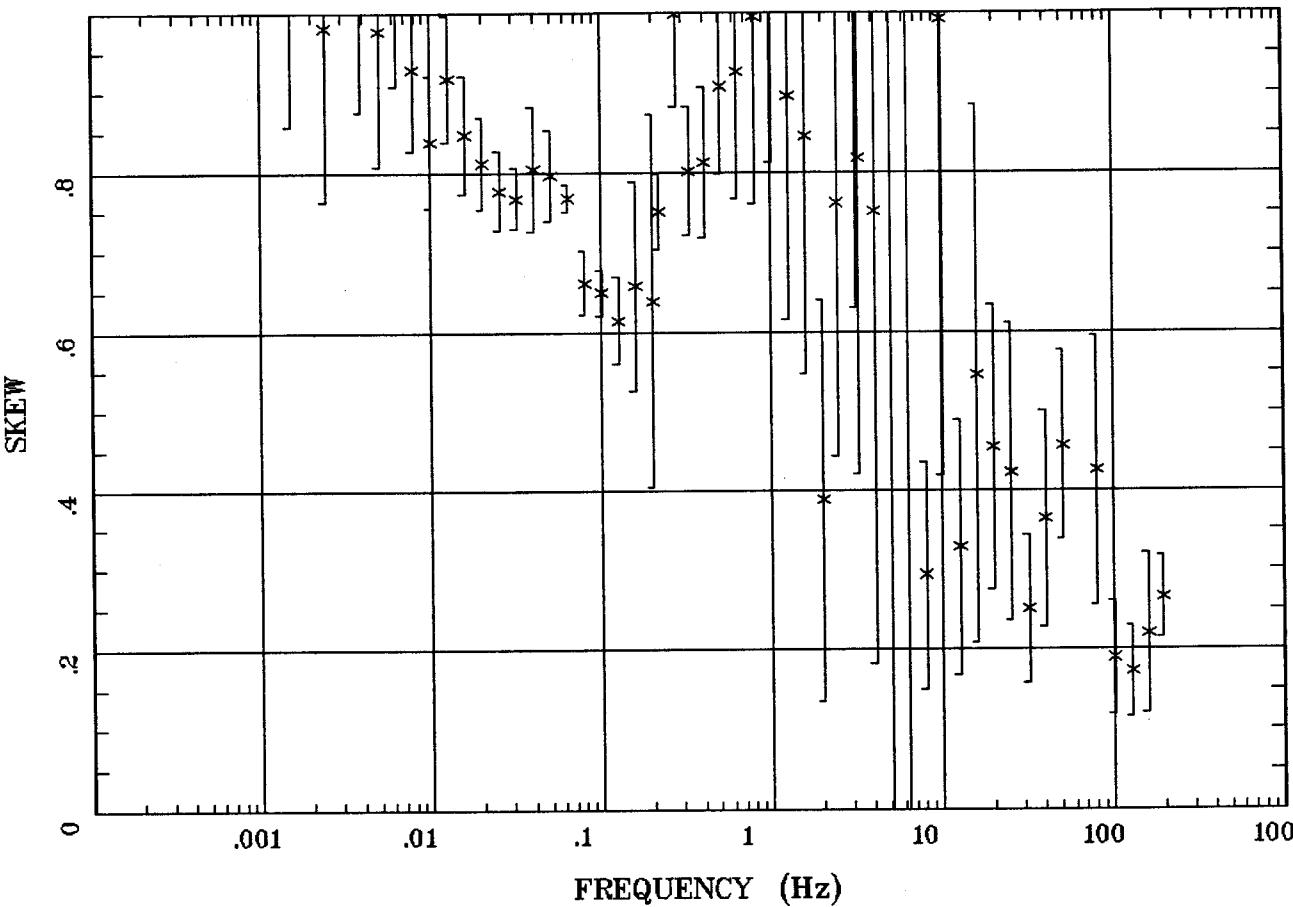
## ROTATION ANGLE



Client:  
Remote:  
Acquired: 19:5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s45r20.a02  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 13:11 Dec 08, 2004  
< EMI - ElectroMagnetic Instruments >

## IMPEDANCE SKEW



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

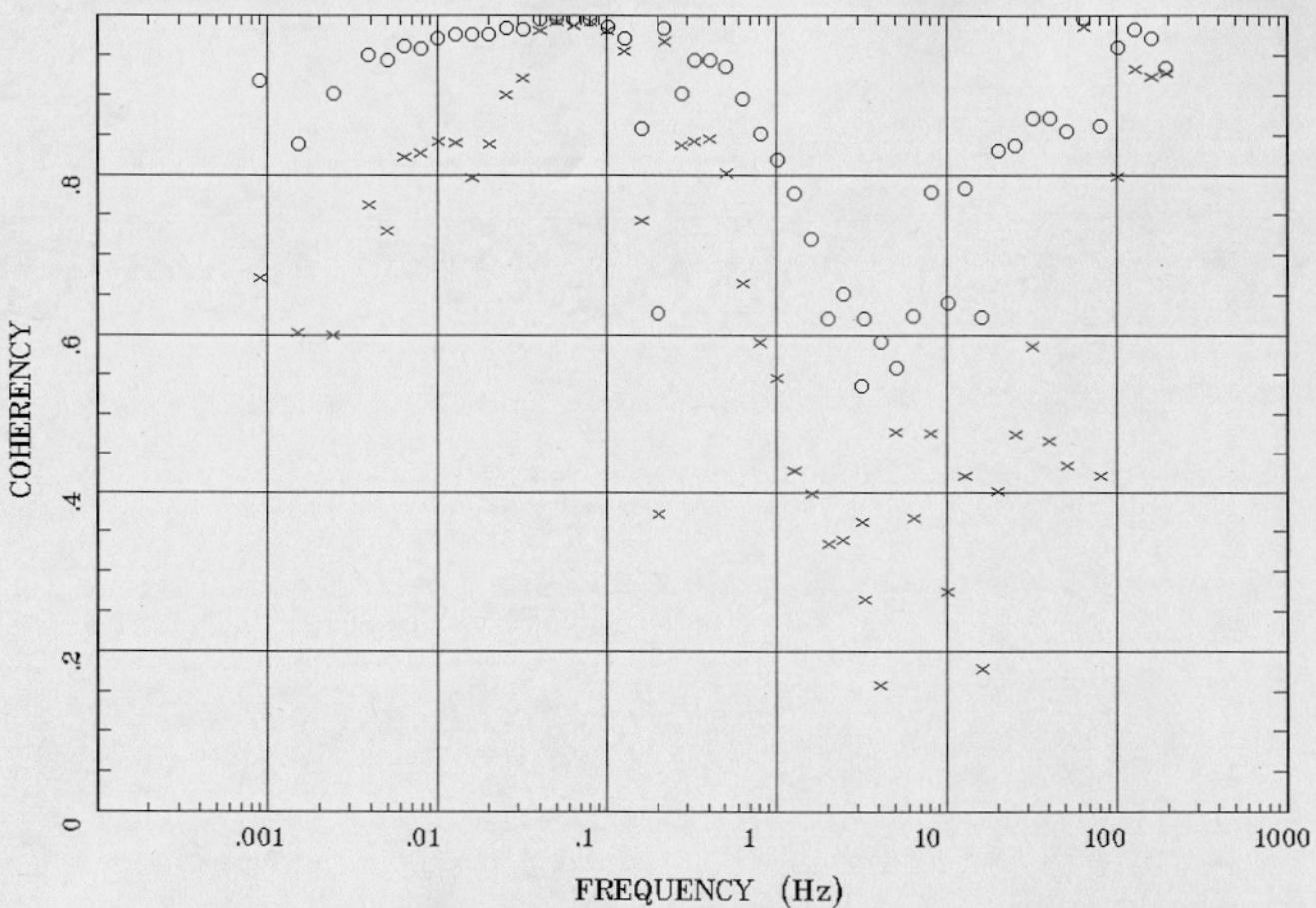
Filename: s45r20.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:11 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

E MULT Coh.



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

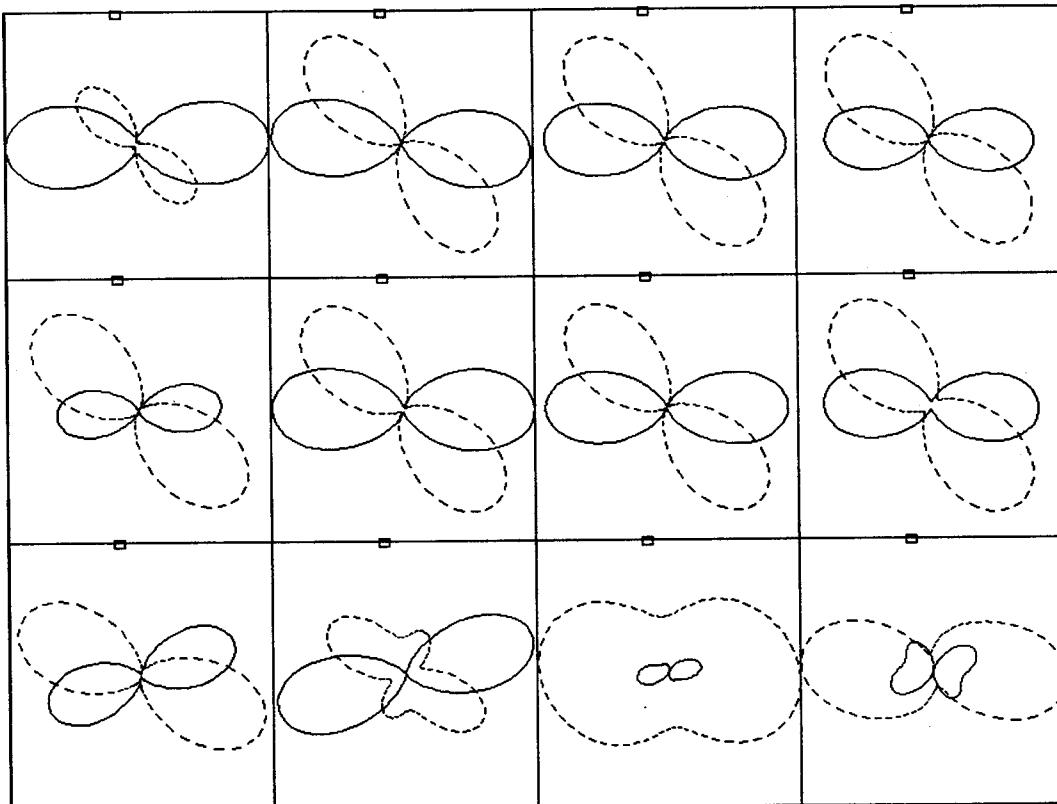
Filename: s45r20.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:11 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## POLAR PLOTS



.0009 Hz  
.101 Hz  
4.077 Hz

.0050 Hz  
.278 Hz  
10.132 Hz

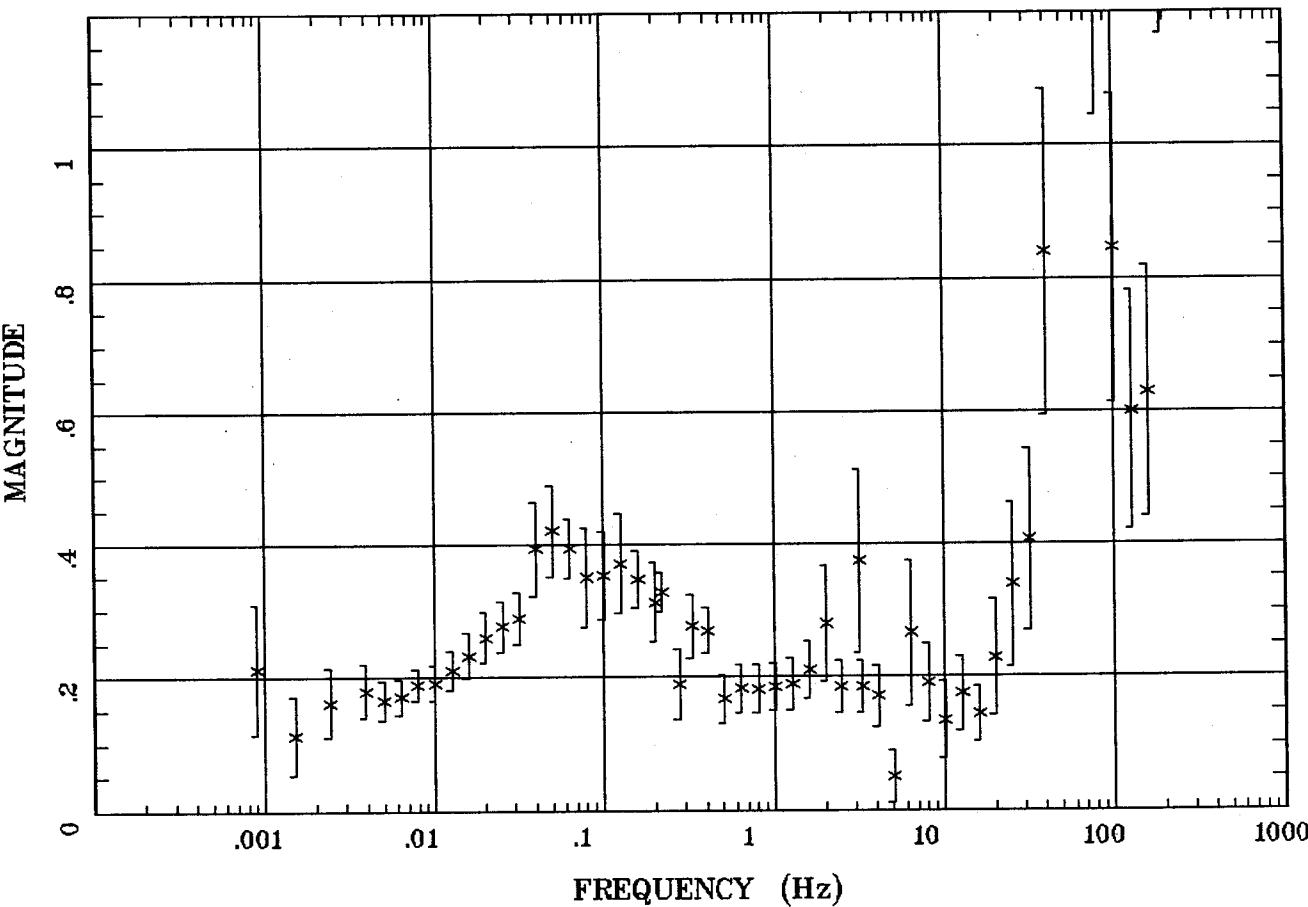
.0127 Hz  
.639 Hz  
31.982 Hz

.0402 Hz  
1.607 Hz  
80.322 Hz

Client:  
Remote:  
Acquired: 19:5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s45r20.a02  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 13:11 Dec 08, 2004  
< EMI - ElectroMagnetic Instruments >

## TIPPER MAGNITUDE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

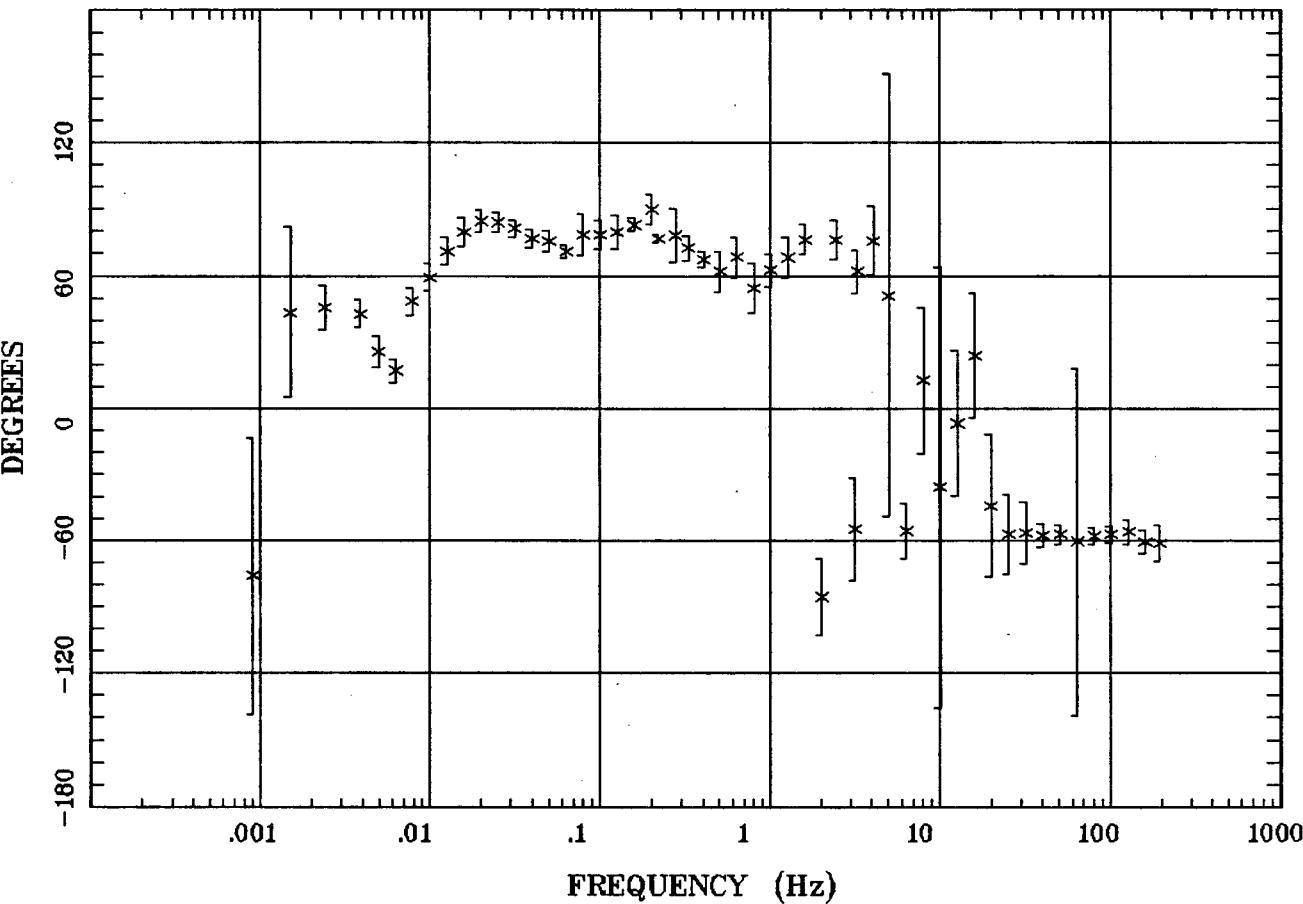
Filename: s45r20.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:11 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

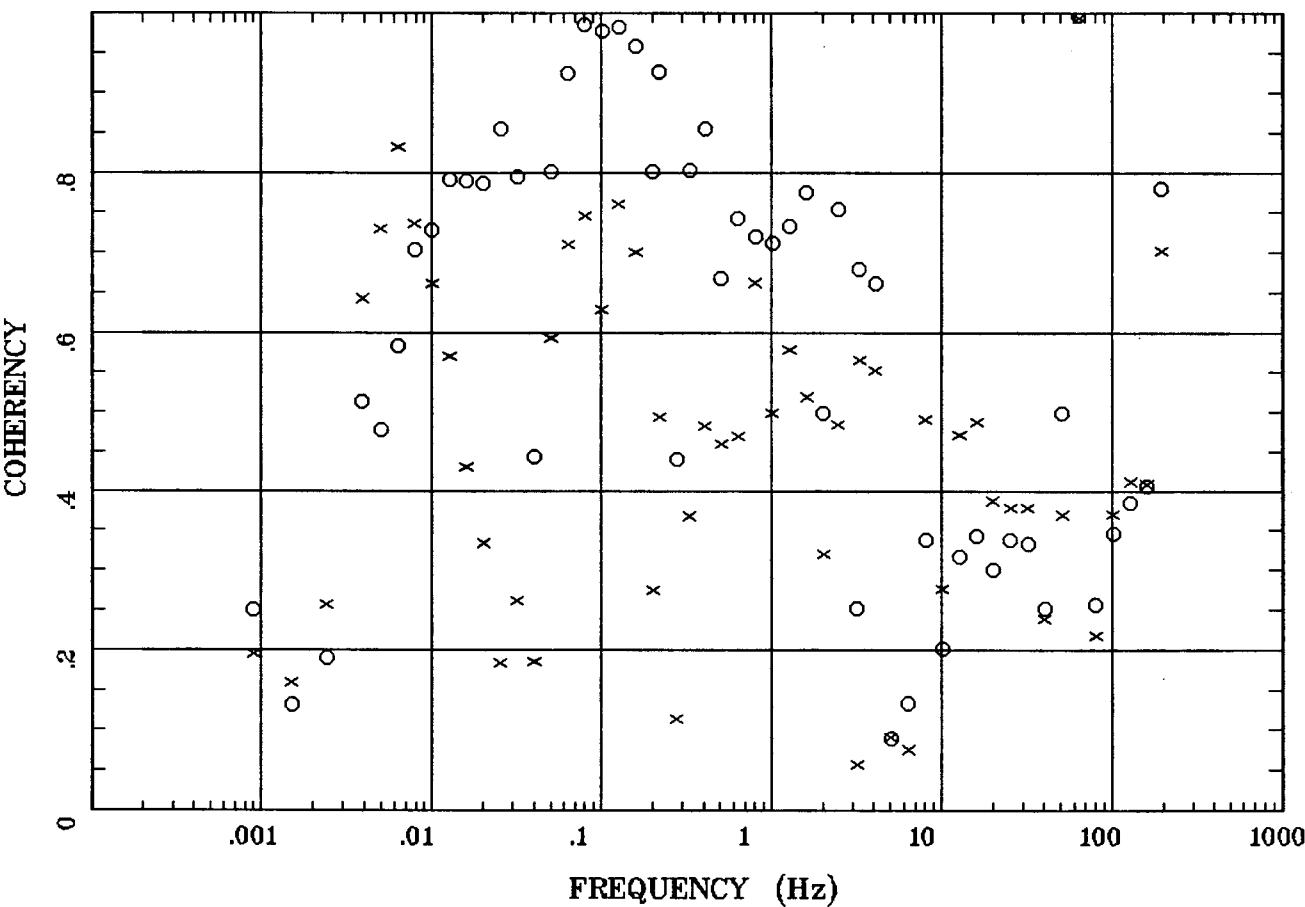
## TIPPER STRIKE



Client:  
Remote:  
Acquired: 19.5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s45r20.a02  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 13:11 Dec 08, 2004  
< EMI - ElectroMagnetic Instruments >

HzHx.x Coh HzHy.o



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

Filename: s45r20.a02

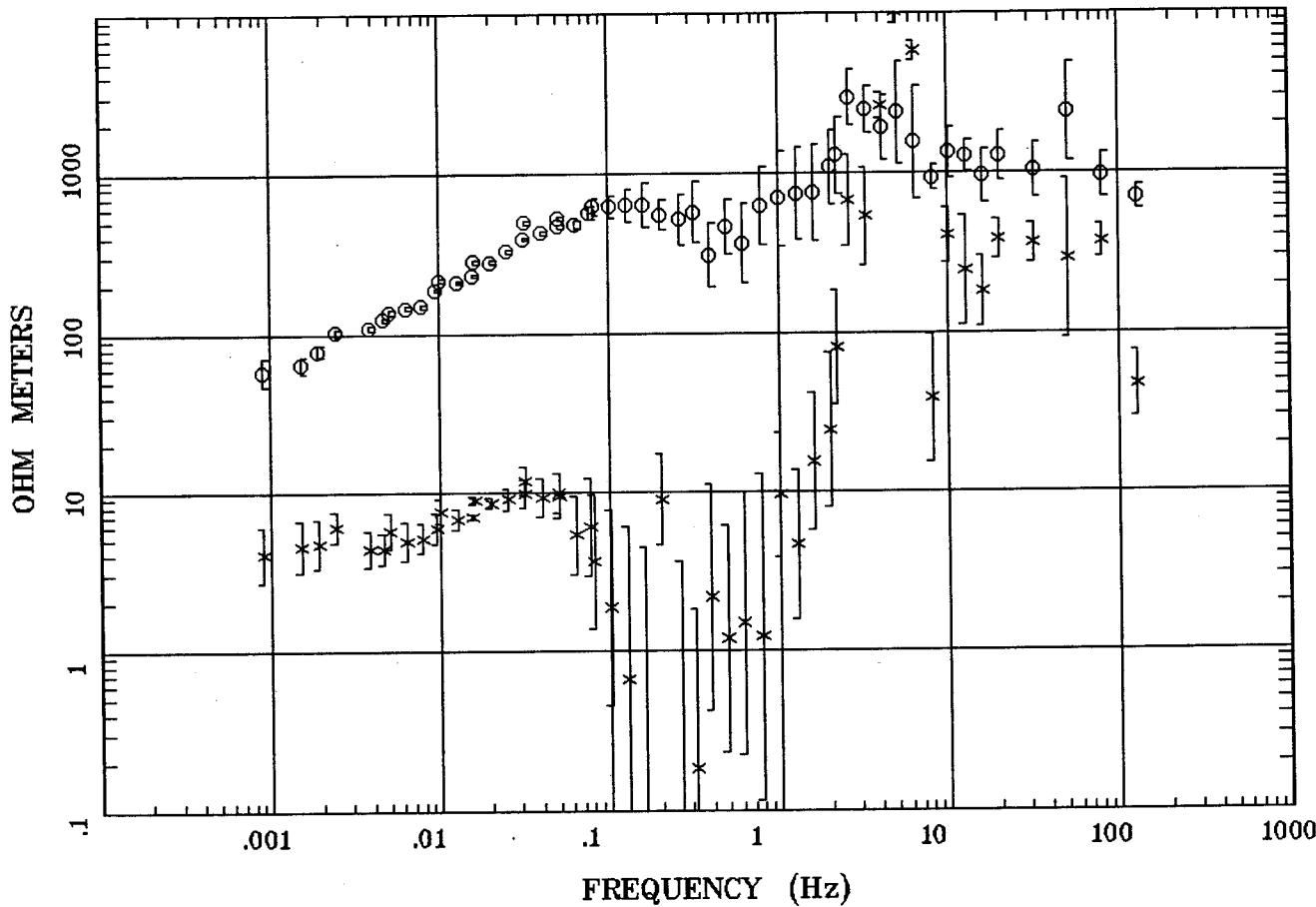
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:11 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

Station 46

APPARENT RESISTIVITY



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

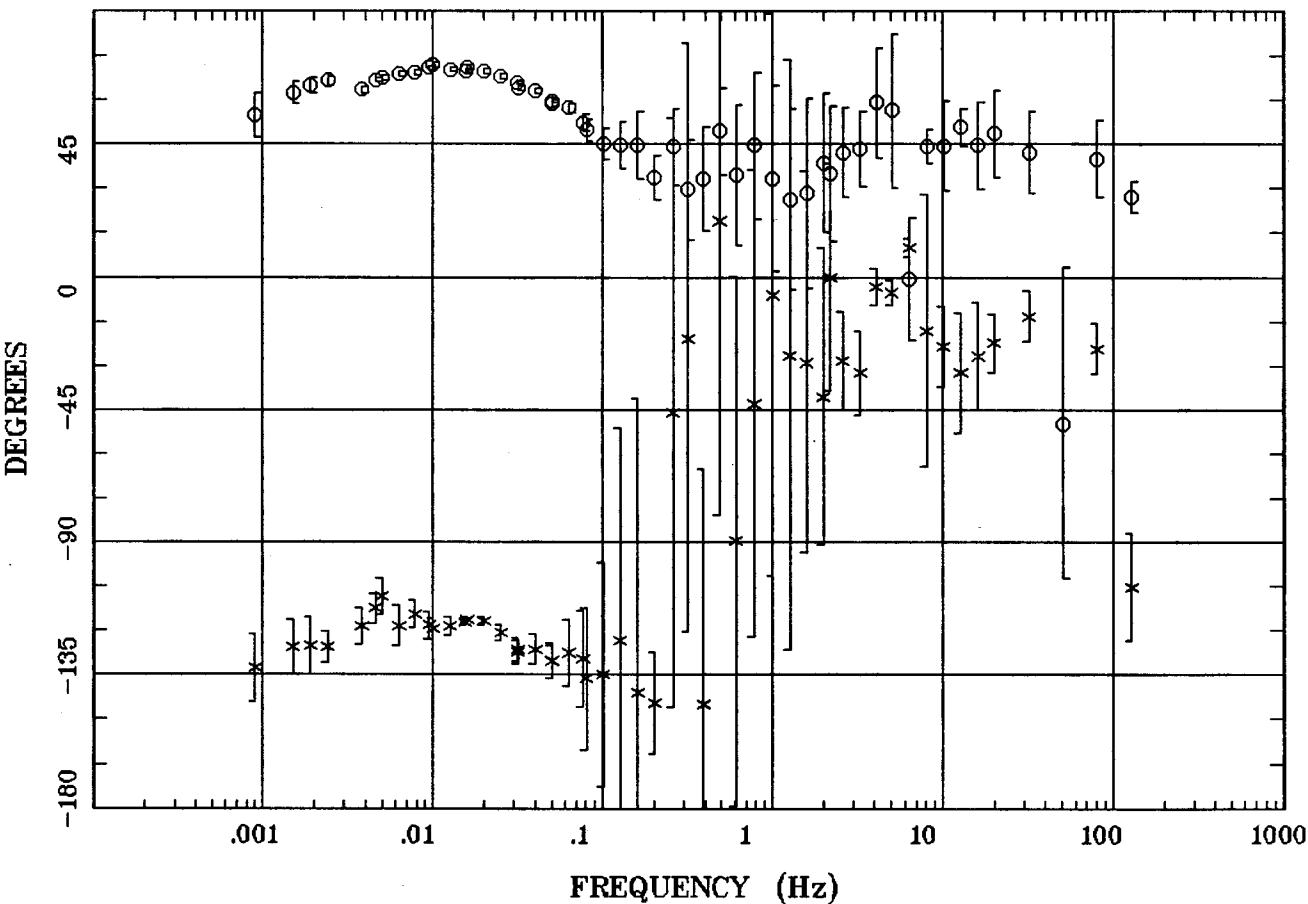
Filename: s46r9.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:12 Dec 08, 2004

< EMI - ElectroMagnetic Instruments >

## IMPEDANCE PHASE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

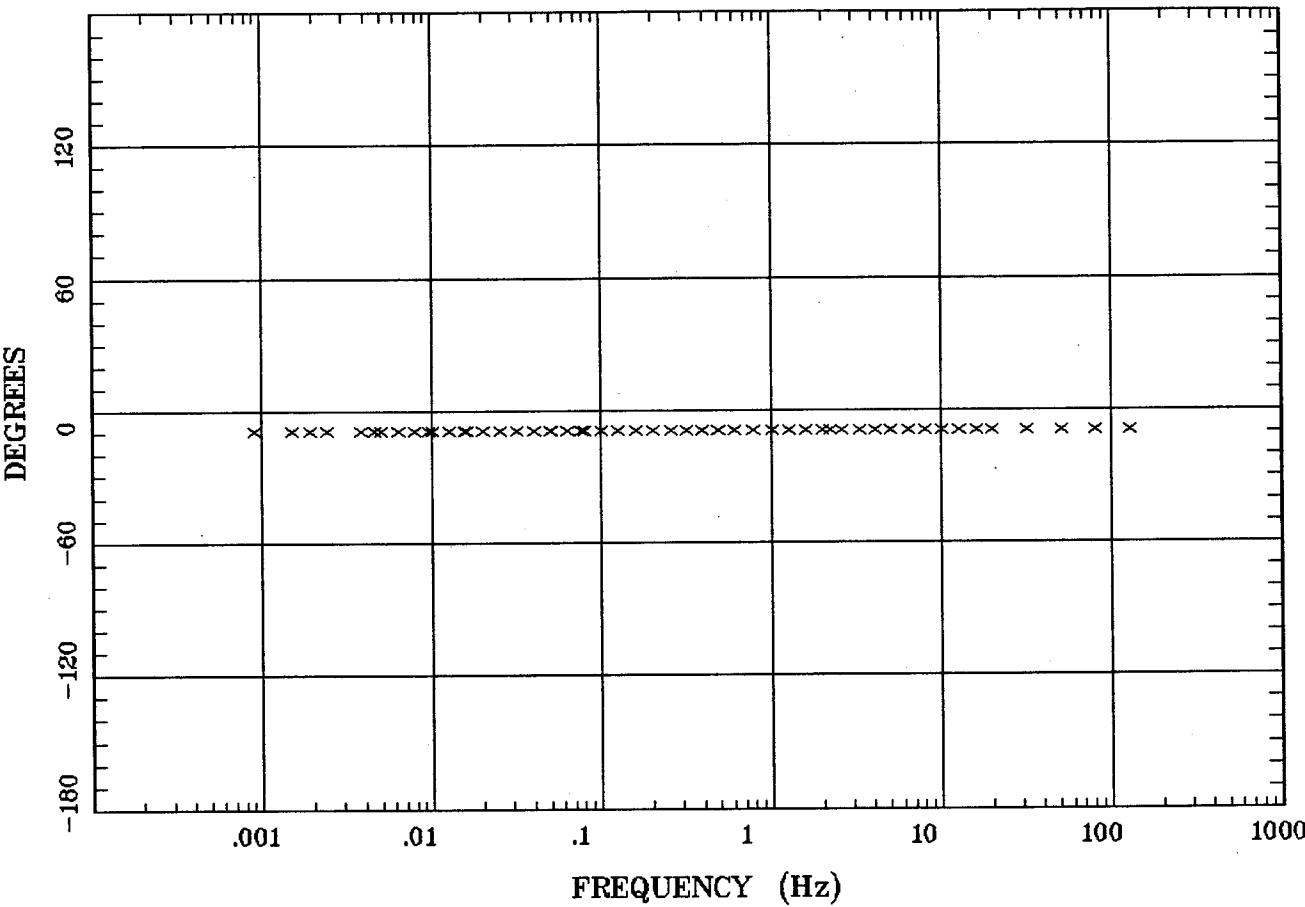
Filename: s46r9.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:12 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## ROTATION ANGLE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

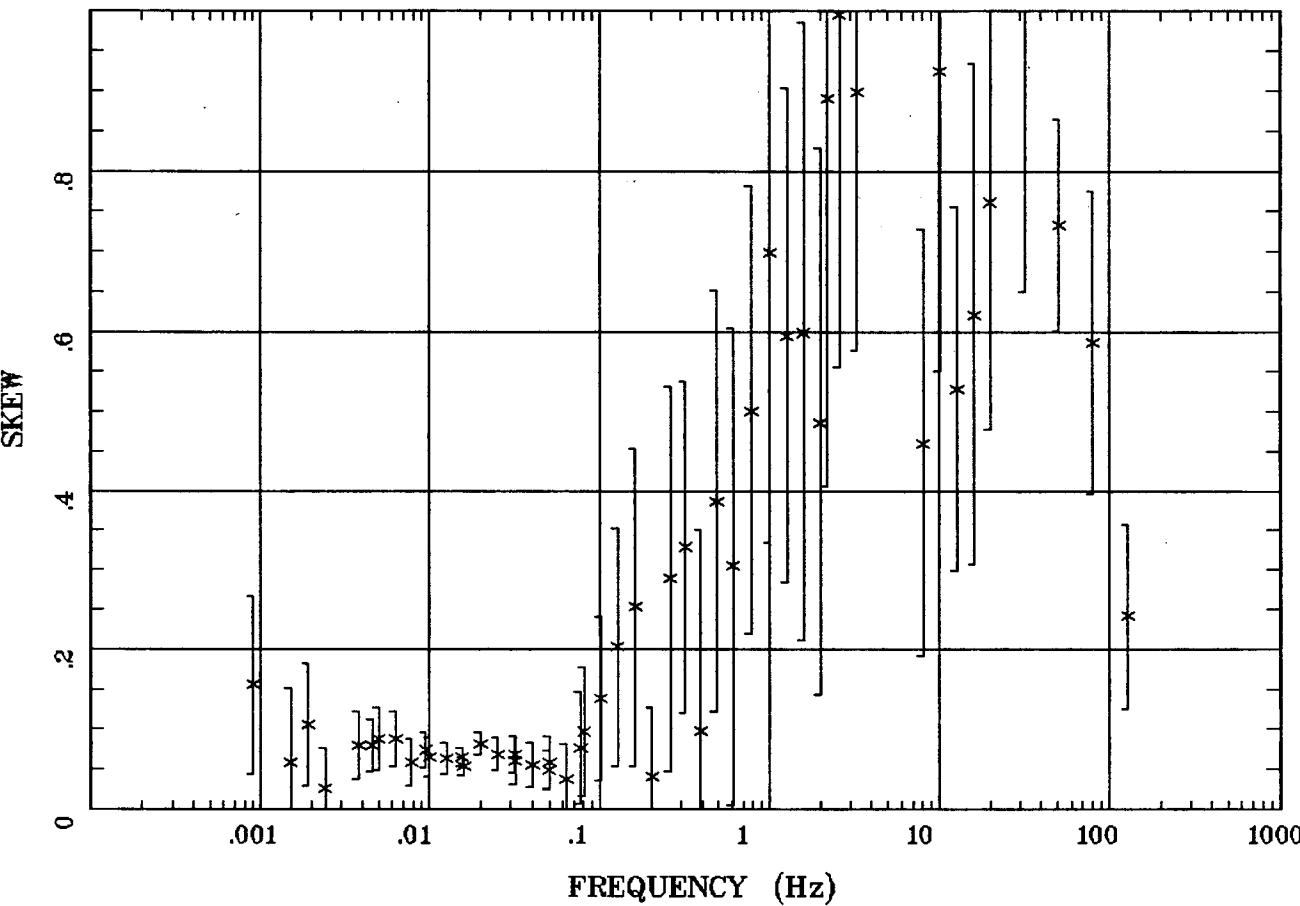
Filename: s46r9.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:12 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## IMPEDANCE SKEW



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

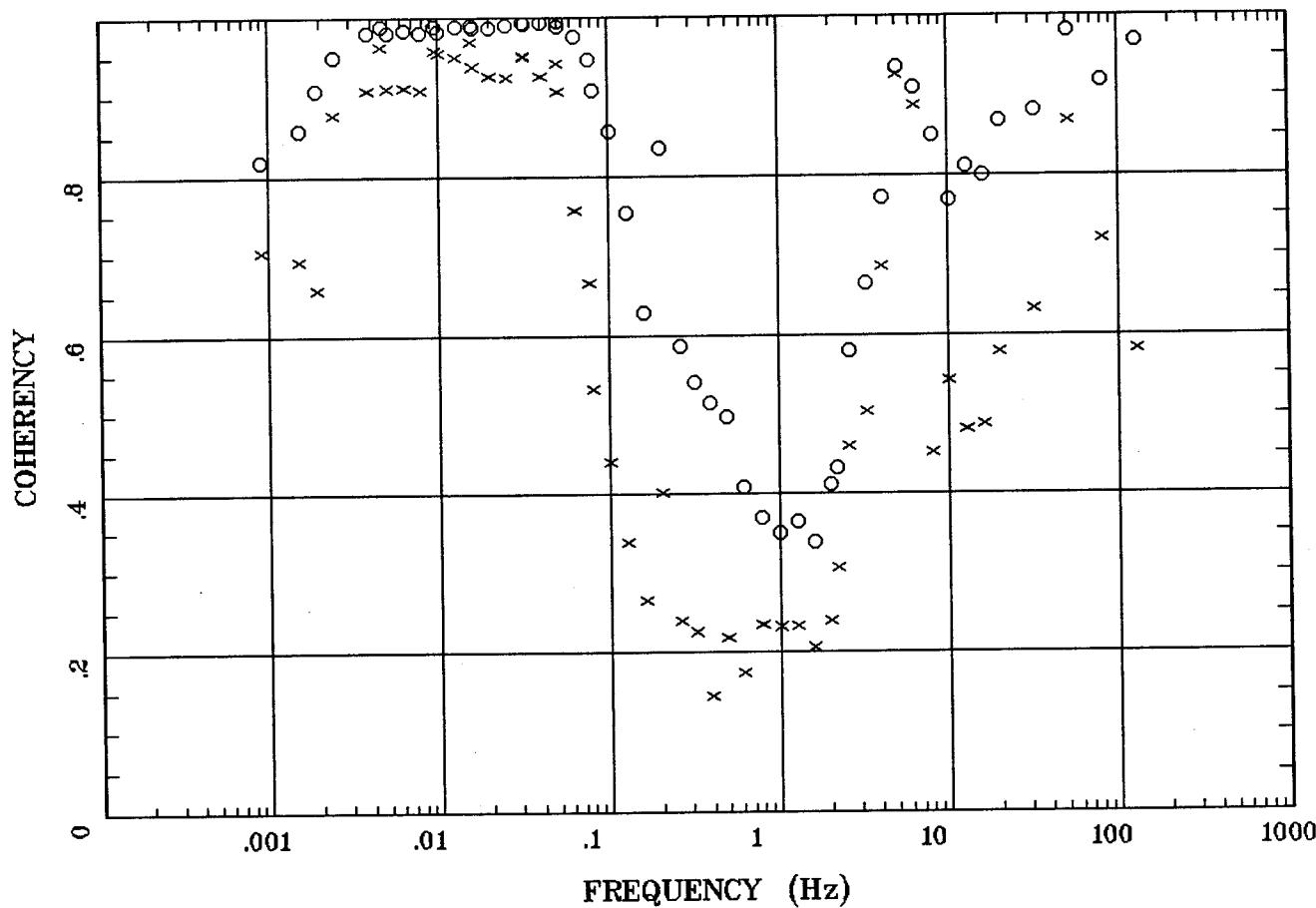
Filename: s46r9.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:12 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## E MULT Coh.



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

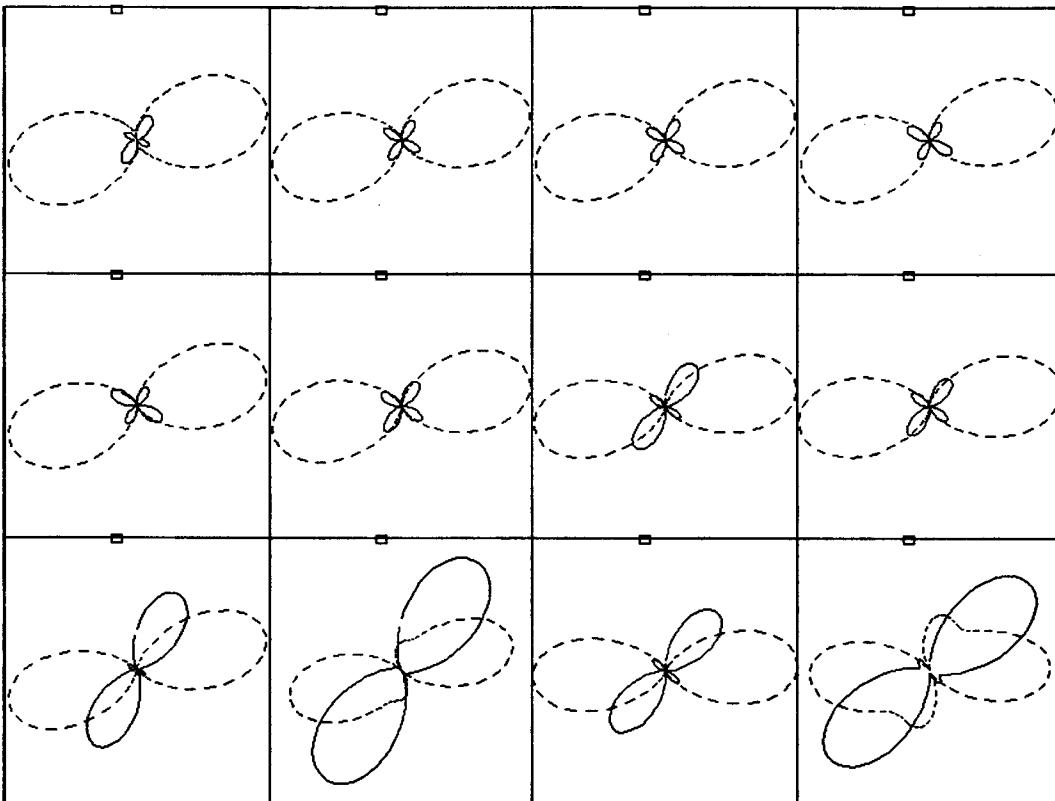
Filename: s46r9.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:12 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## POLAR PLOTS



.0009 Hz

.0319 Hz

1.270 Hz

.0038 Hz

.0768 Hz

2.588 Hz

.0078 Hz

.160 Hz

8.057 Hz

.0159 Hz

.391 Hz

20.020 Hz

## Rotation:

Filename: s46r9.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:12 Dec 08, 2004

< EMI - ElectroMagnetic Instruments >

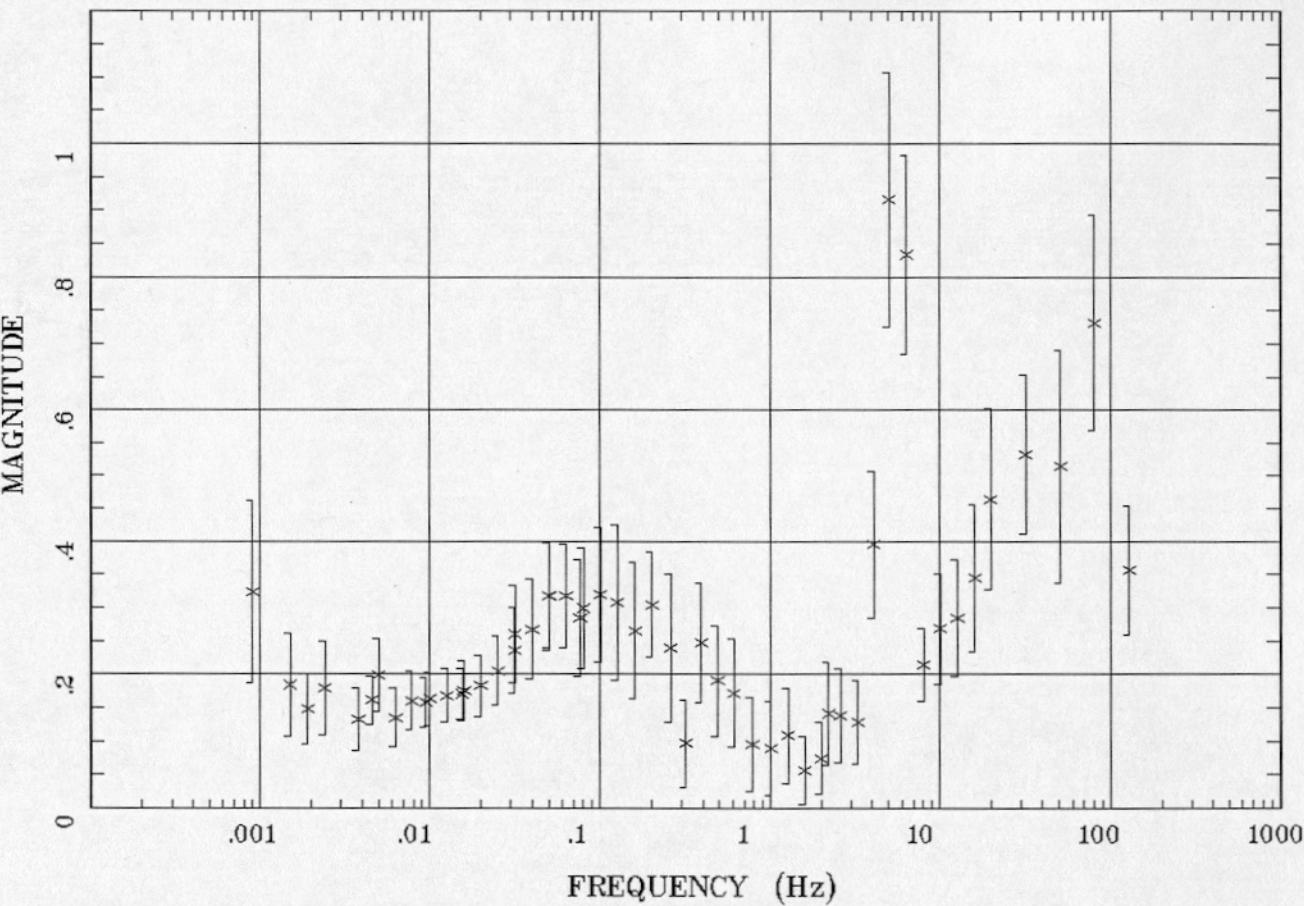
Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

## TIPPER MAGNITUDE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

Filename: s46r9.a02

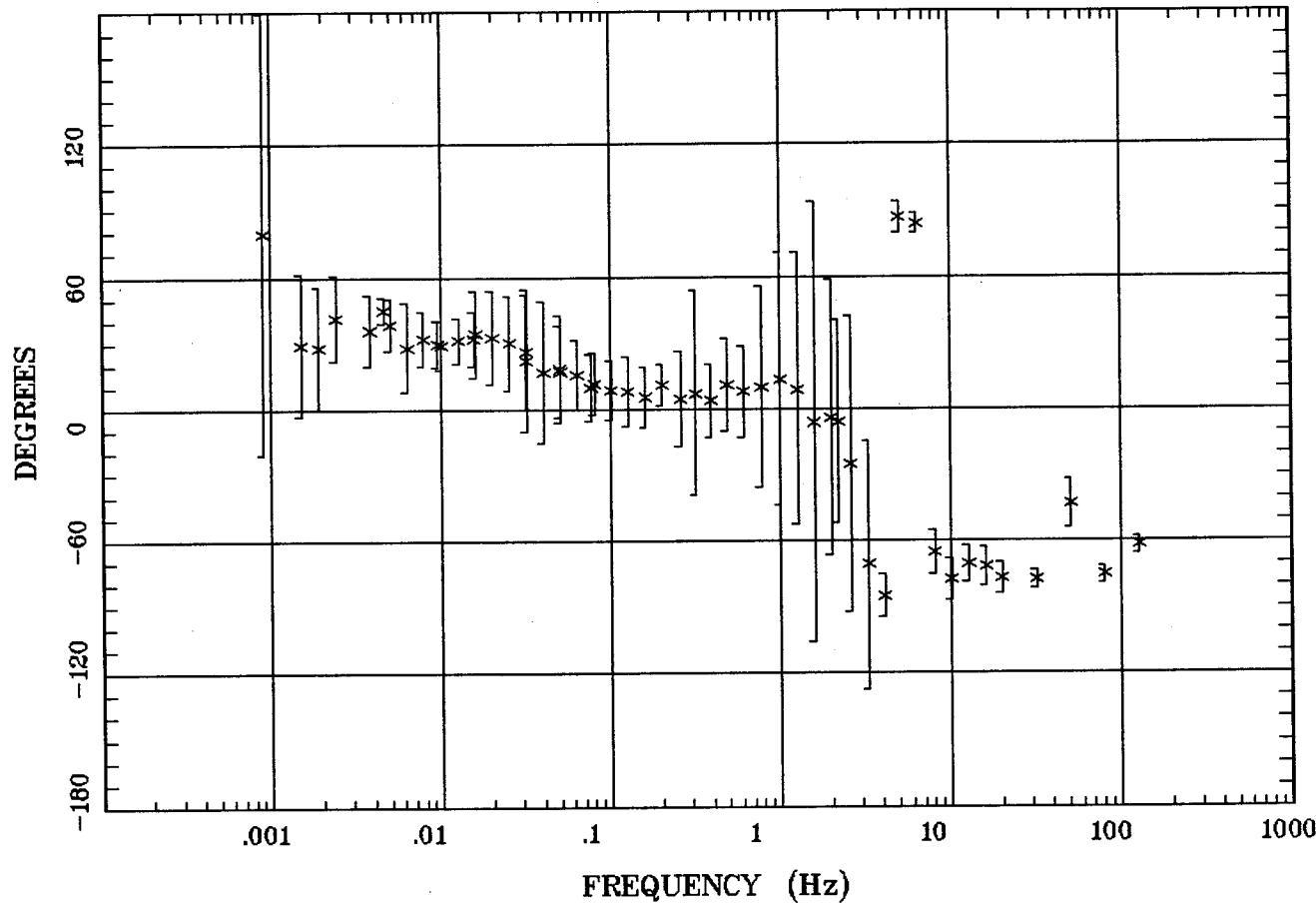
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:12 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

# Station 46

TIPPER STRIKE



Rotation:

Filename: s46r9.a02

Client:

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Remote:

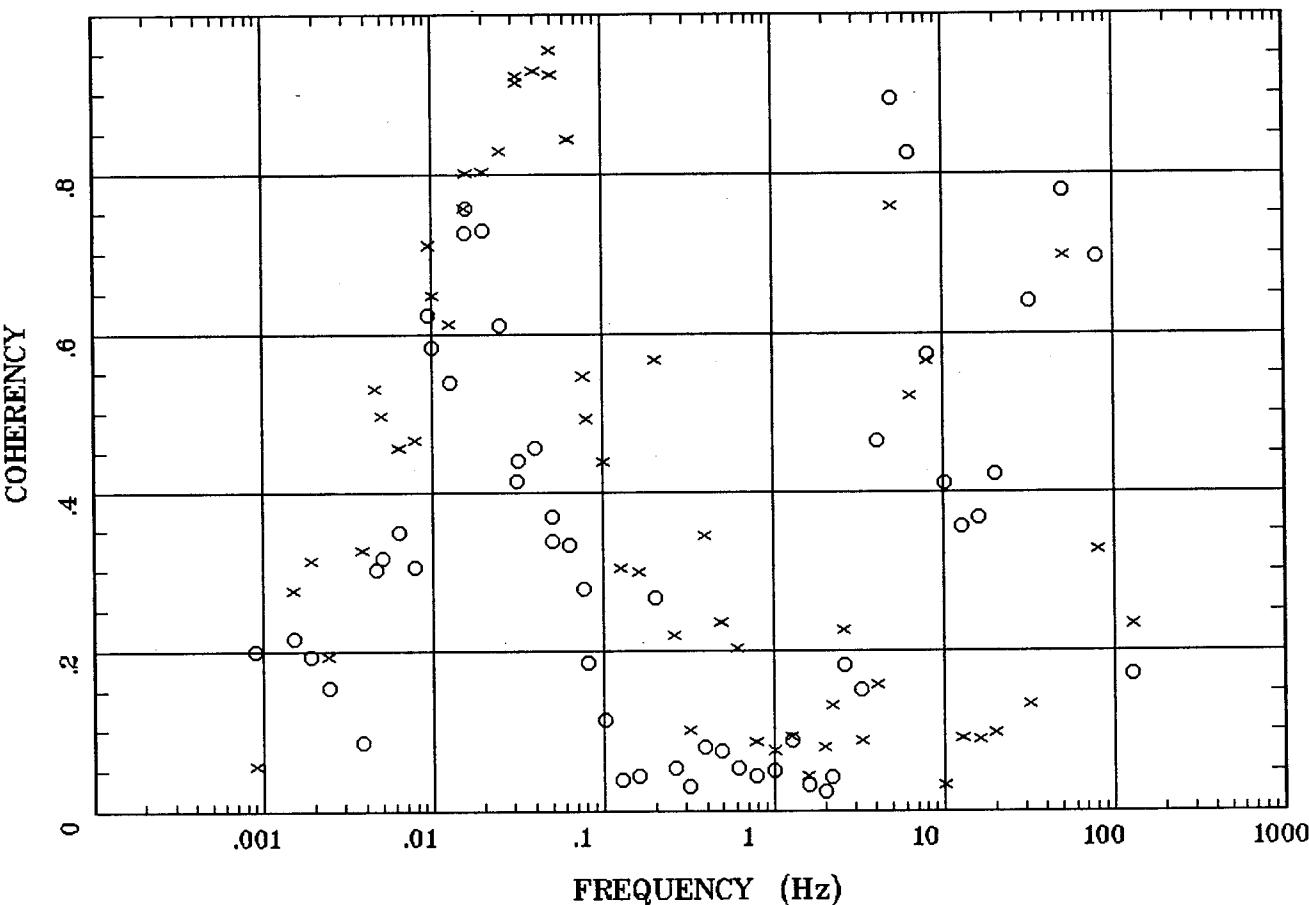
Plotted: 13:12 Dec 08, 2004

Acquired: 19:5 Mar 08, 1998

Survey Co:

< EMI - ElectroMagnetic Instruments >

HzHx.x Coh HzHy.o



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

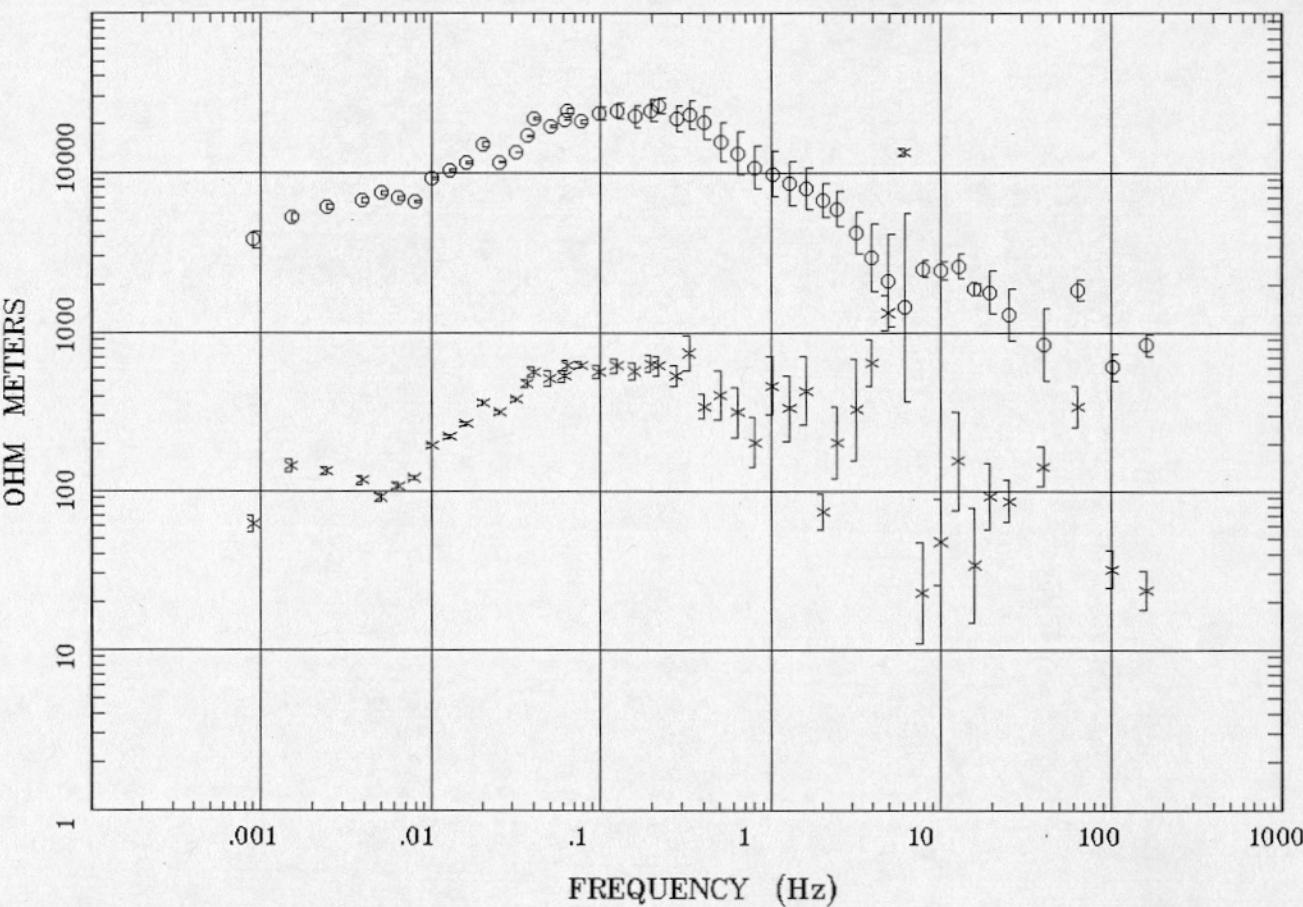
Filename: s46r9.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:12 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## APPARENT RESISTIVITY



Client:

Rotation:

Remote:

Filename: s47r10.a02

Acquired: 19:5 Mar 08, 1998

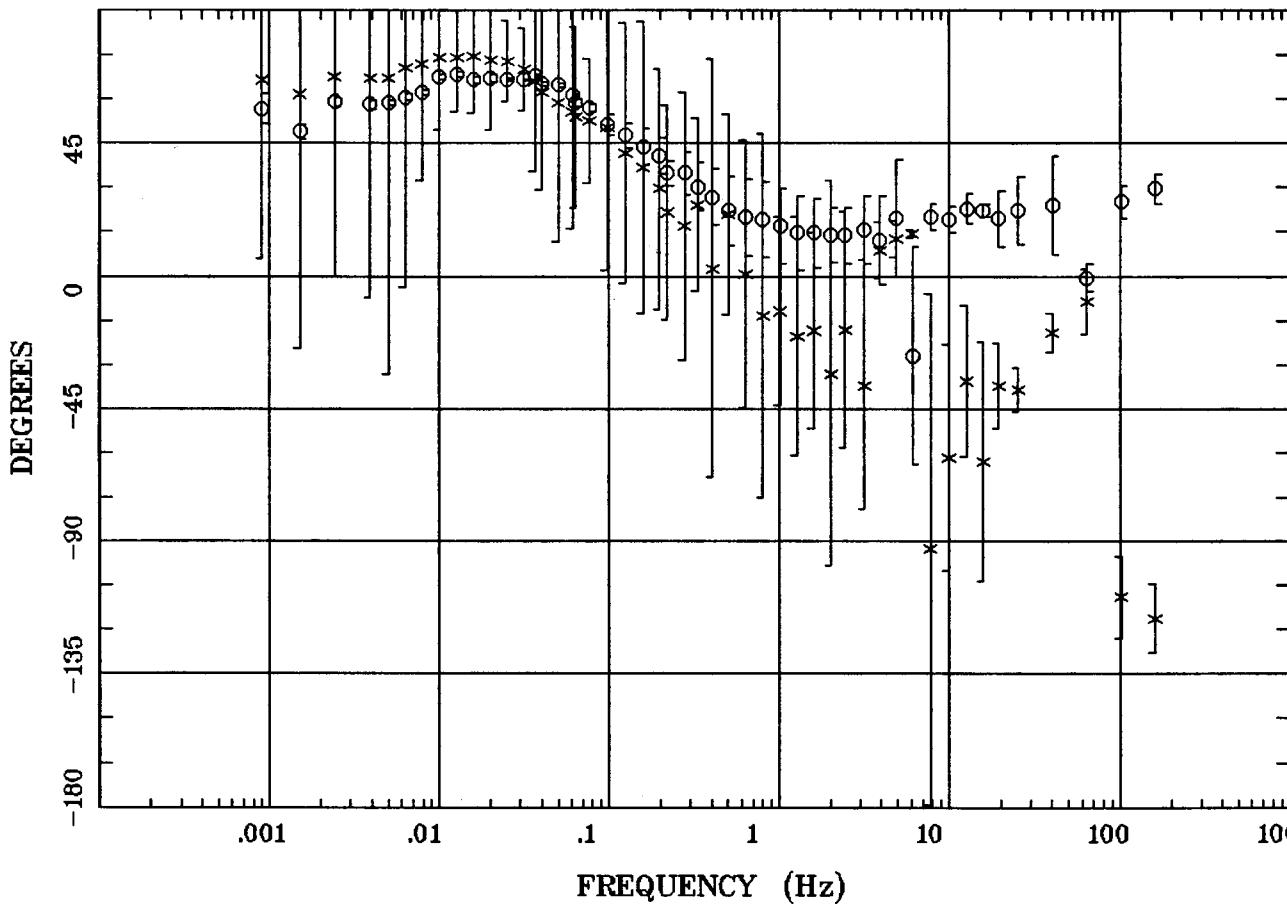
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Survey Co:

Plotted: 13:13 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## IMPEDANCE PHASE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

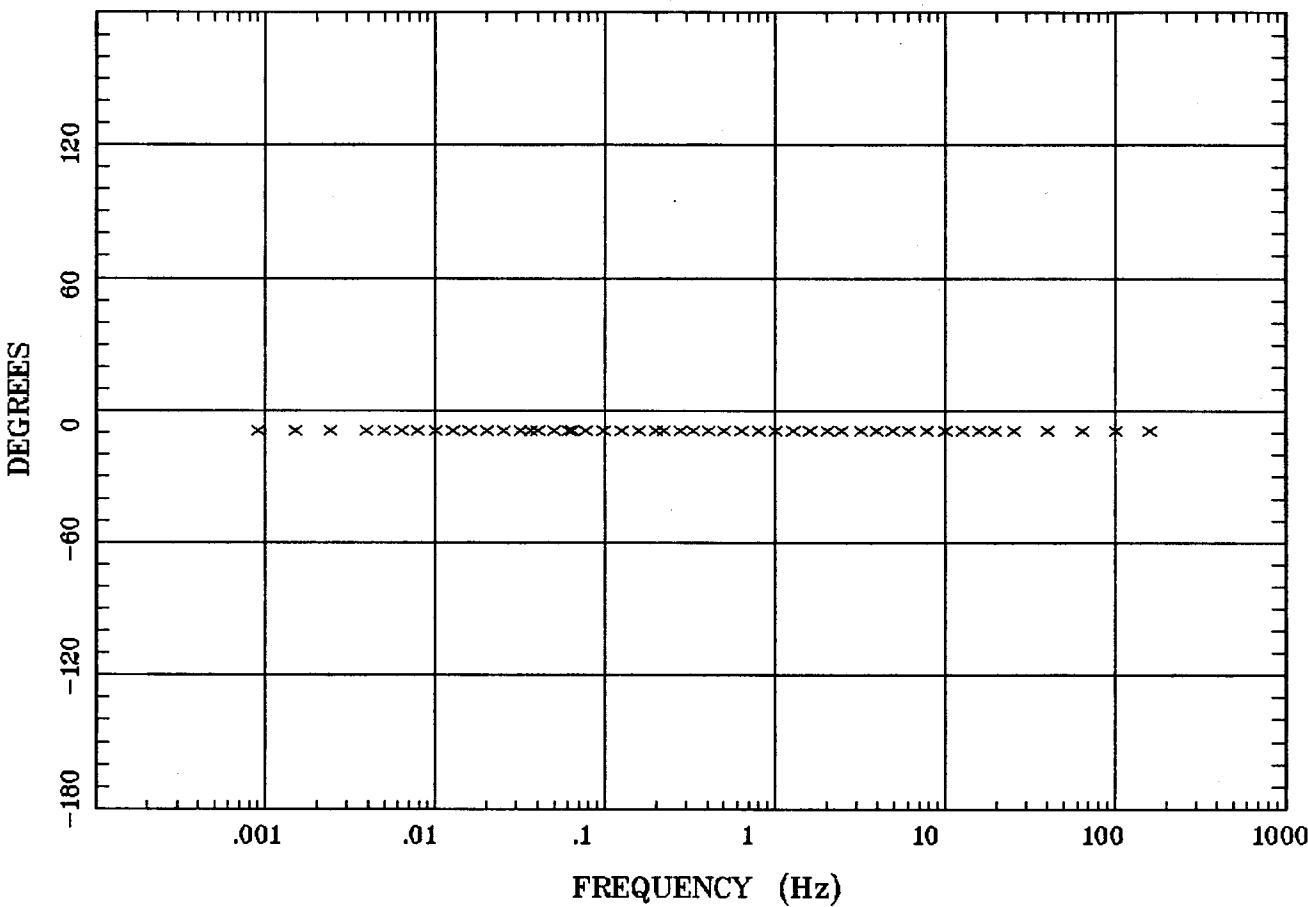
Filename: s47r10.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:13 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

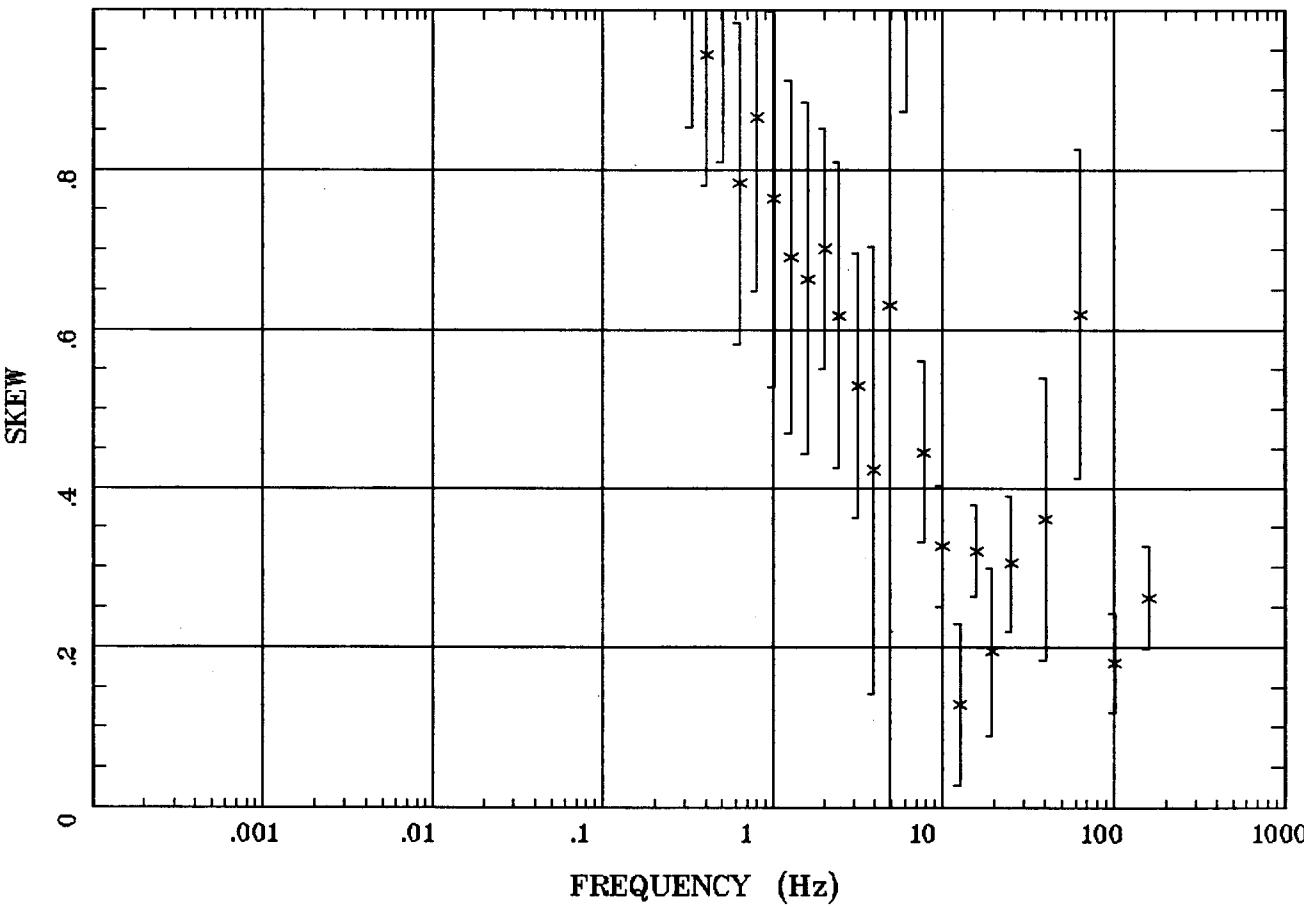
## ROTATION ANGLE



Client:  
Remote:  
Acquired: 19:5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s47r10.a02  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 13:13 Dec 08, 2004  
< EMI - ElectroMagnetic Instruments >

## IMPEDANCE SKEW



Client:

Rotation:

Remote:

Filename: s47r10.a02

Acquired: 19:5 Mar 08, 1998

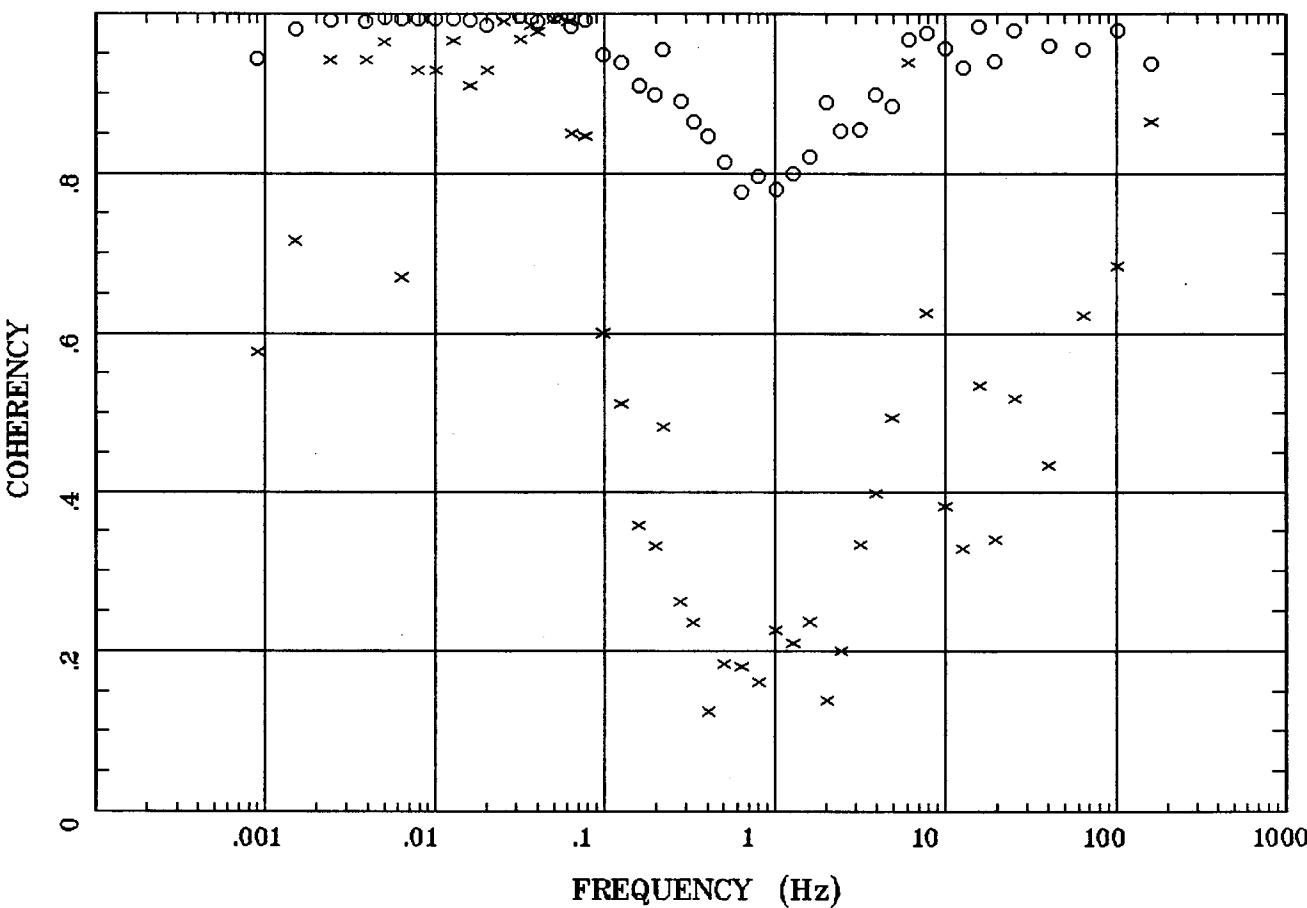
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Survey Co:

Plotted: 13:13 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## E MULT Coh.



Client:

Rotation:

Remote:

Filename: s47r10.a02

Acquired: 19:5 Mar 08, 1998

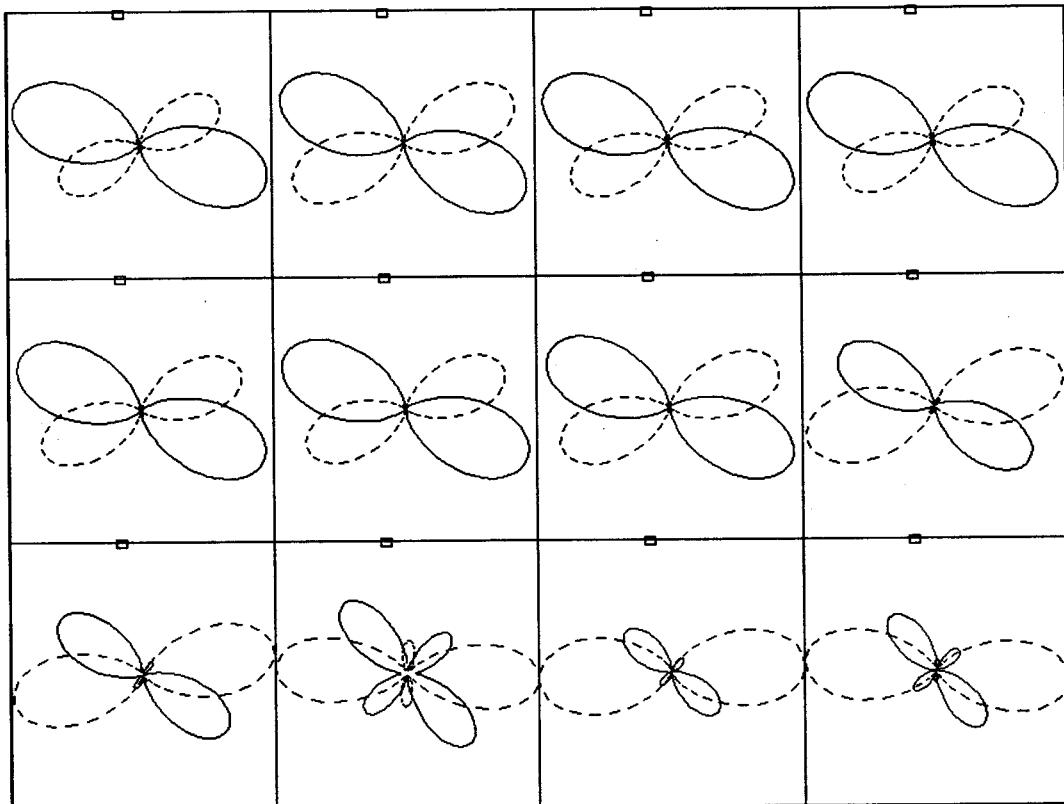
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Survey Co:

Plotted: 13:13 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## POLAR PLOTS



.0009 Hz  
.0610 Hz  
1.602 Hz

.0050 Hz  
.125 Hz  
3.906 Hz

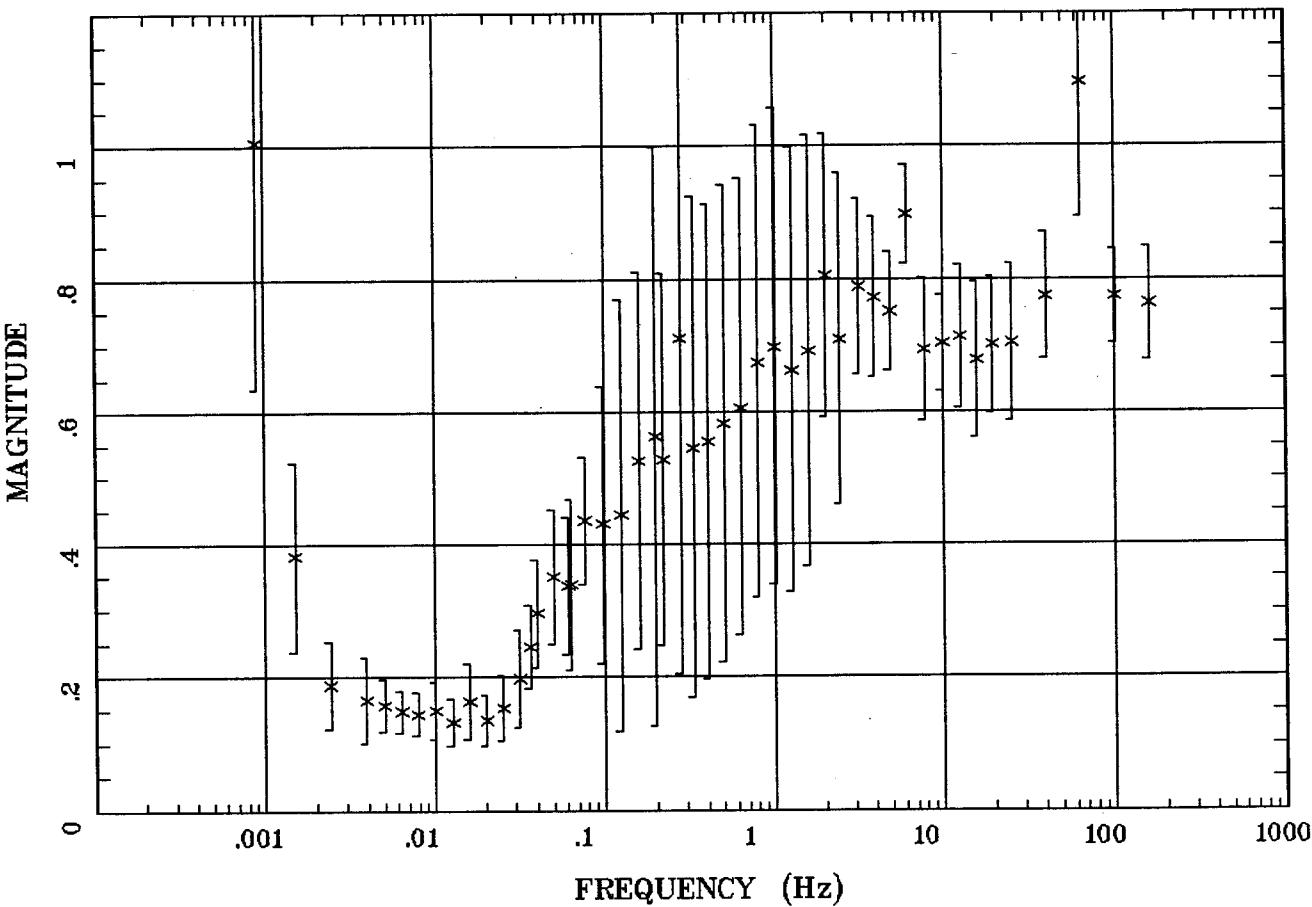
.0127 Hz  
.278 Hz  
10.010 Hz

.0317 Hz  
.635 Hz  
25.391 Hz

Client:  
Remote:  
Acquired: 19:5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s47r10.a02  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 13:13 Dec 08, 2004  
< EMI - ElectroMagnetic Instruments >

## TIPPER MAGNITUDE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

Filename: s47r10.a02

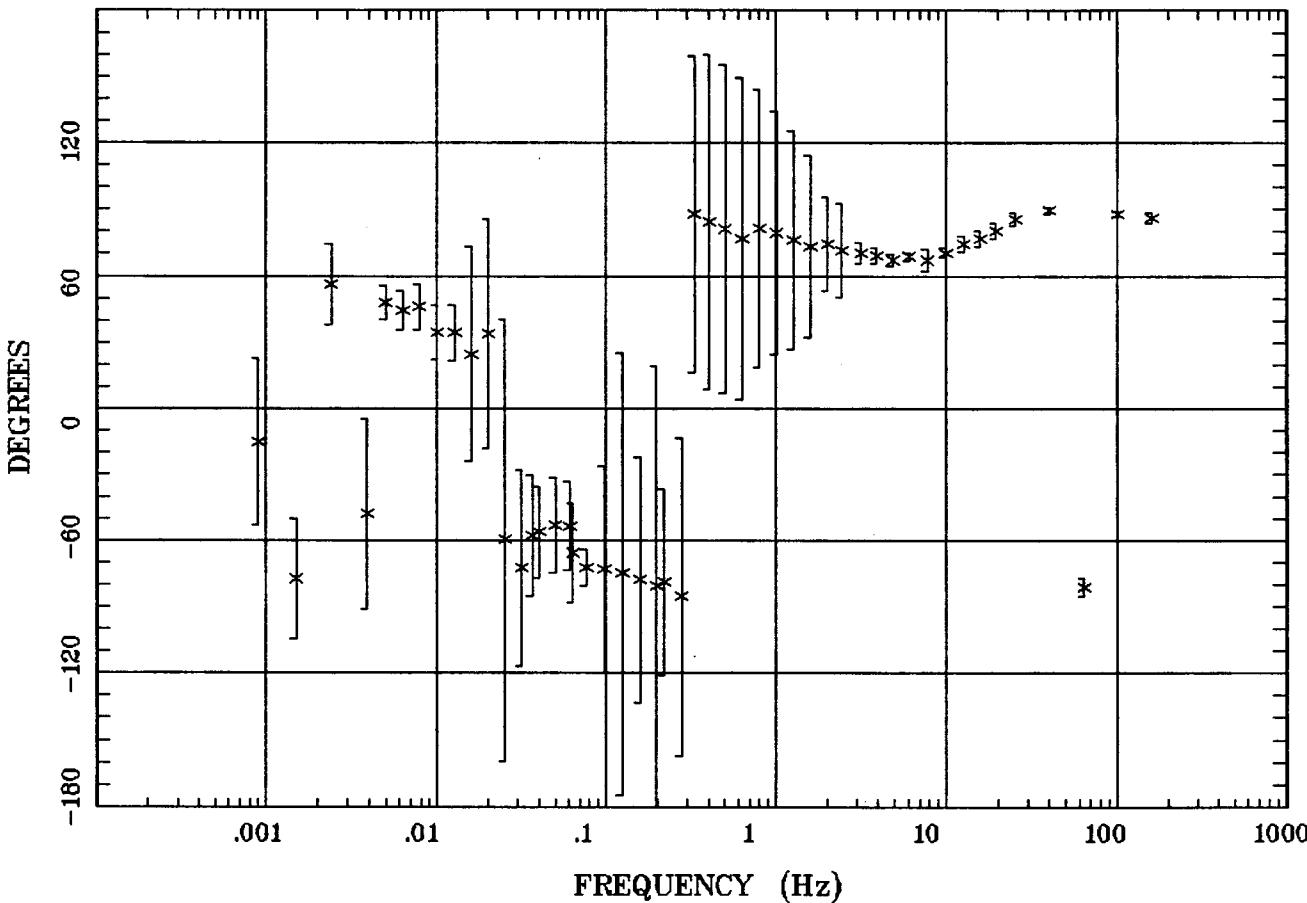
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:13 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## TIPPER STRIKE

56



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

Filename: s47r10.a02

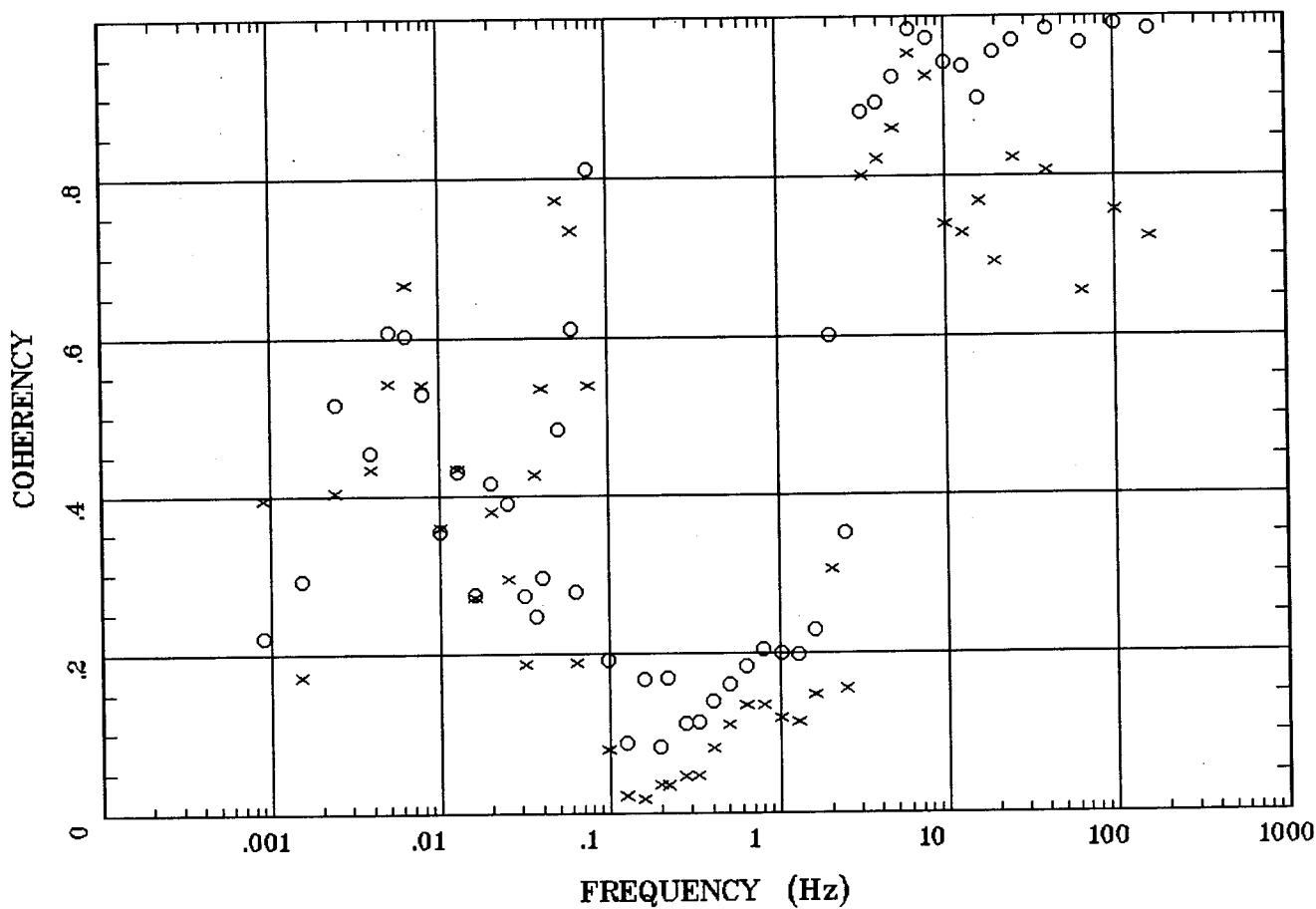
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:13 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

# Station 47

HzHx.x Coh HzHy.o



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

Filename: s47r10.a02

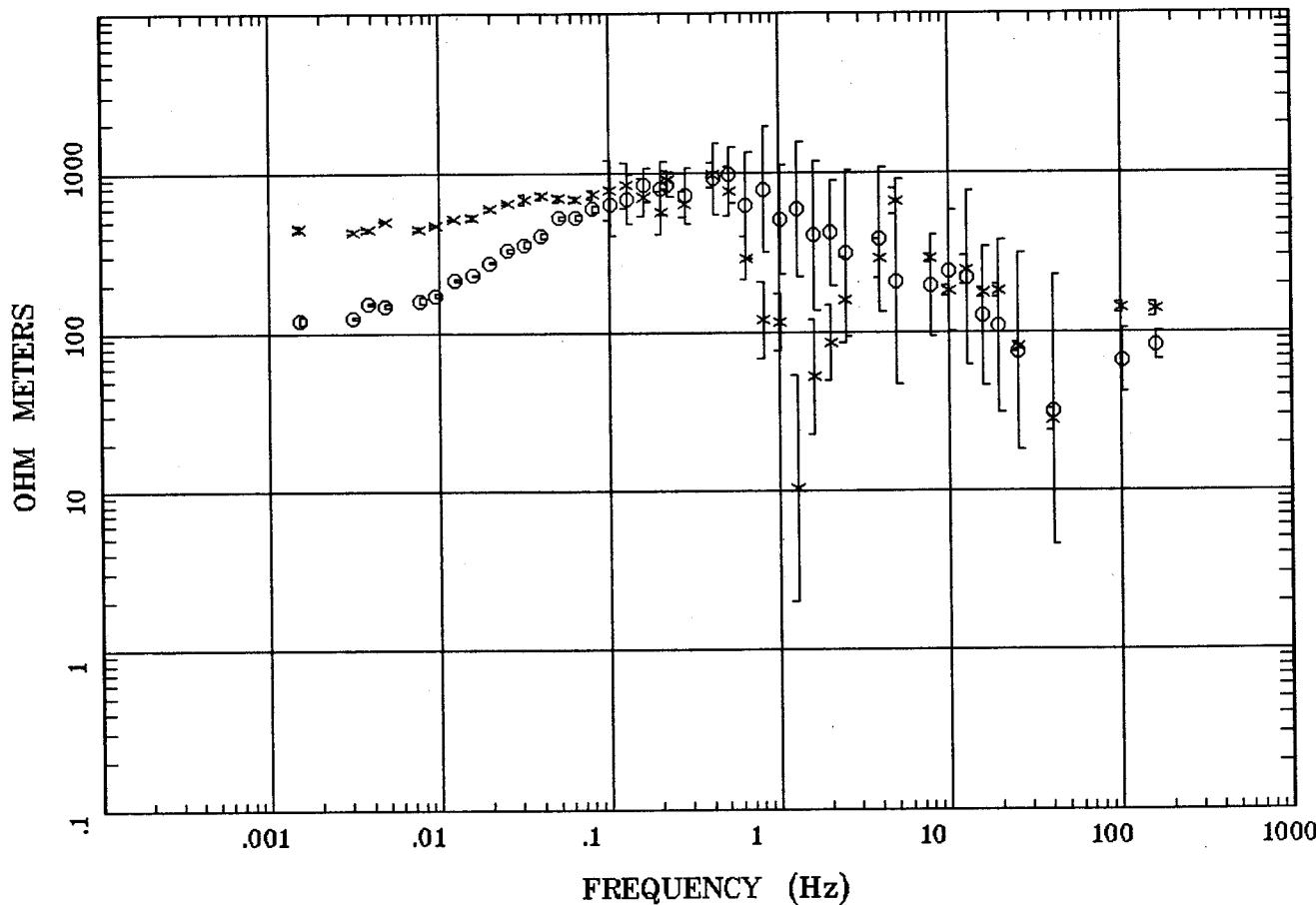
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:13 Dec 08, 2004

< EMI - ElectroMagnetic Instruments >

Station 48

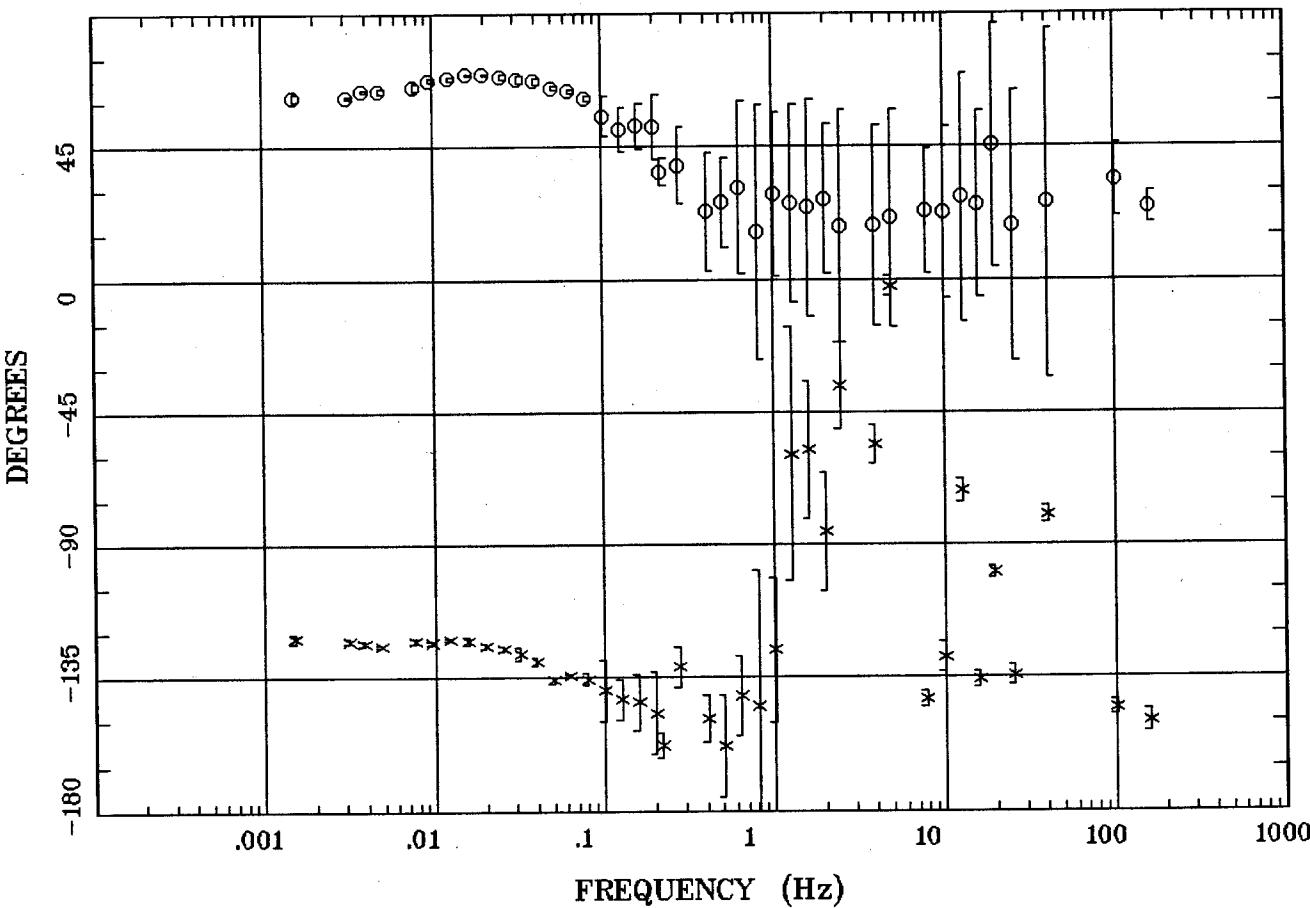
APPARENT RESISTIVITY



Client:  
Remote:  
Acquired: 19:5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s48afed.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 10:20 Dec 13, 2004  
< EMI - ElectroMagnetic Instruments >

## IMPEDANCE PHASE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

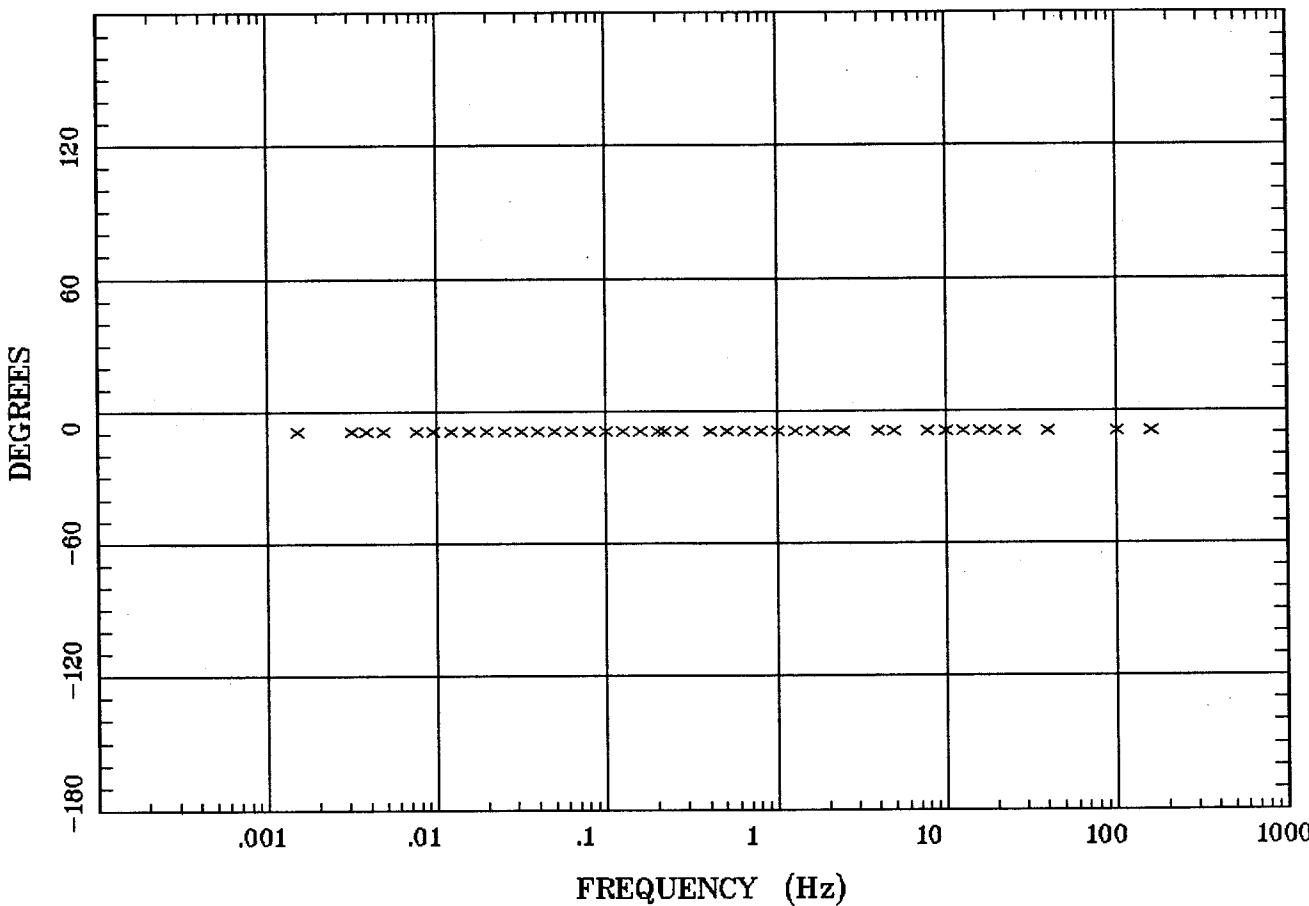
Filename: s48afed.avg

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 10:20 Dec 13, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## ROTATION ANGLE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

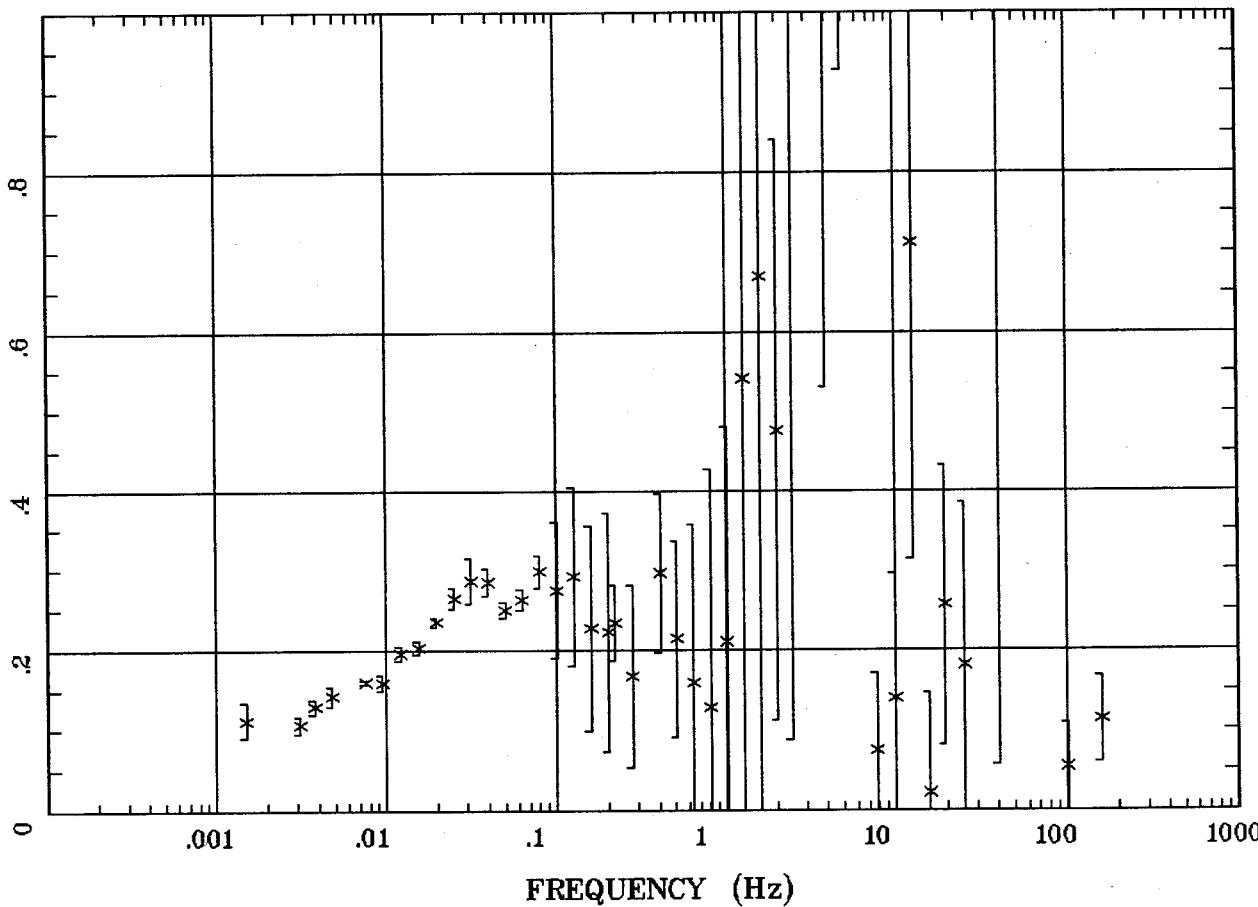
Filename: s48afed.avg

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 10:20 Dec 13, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

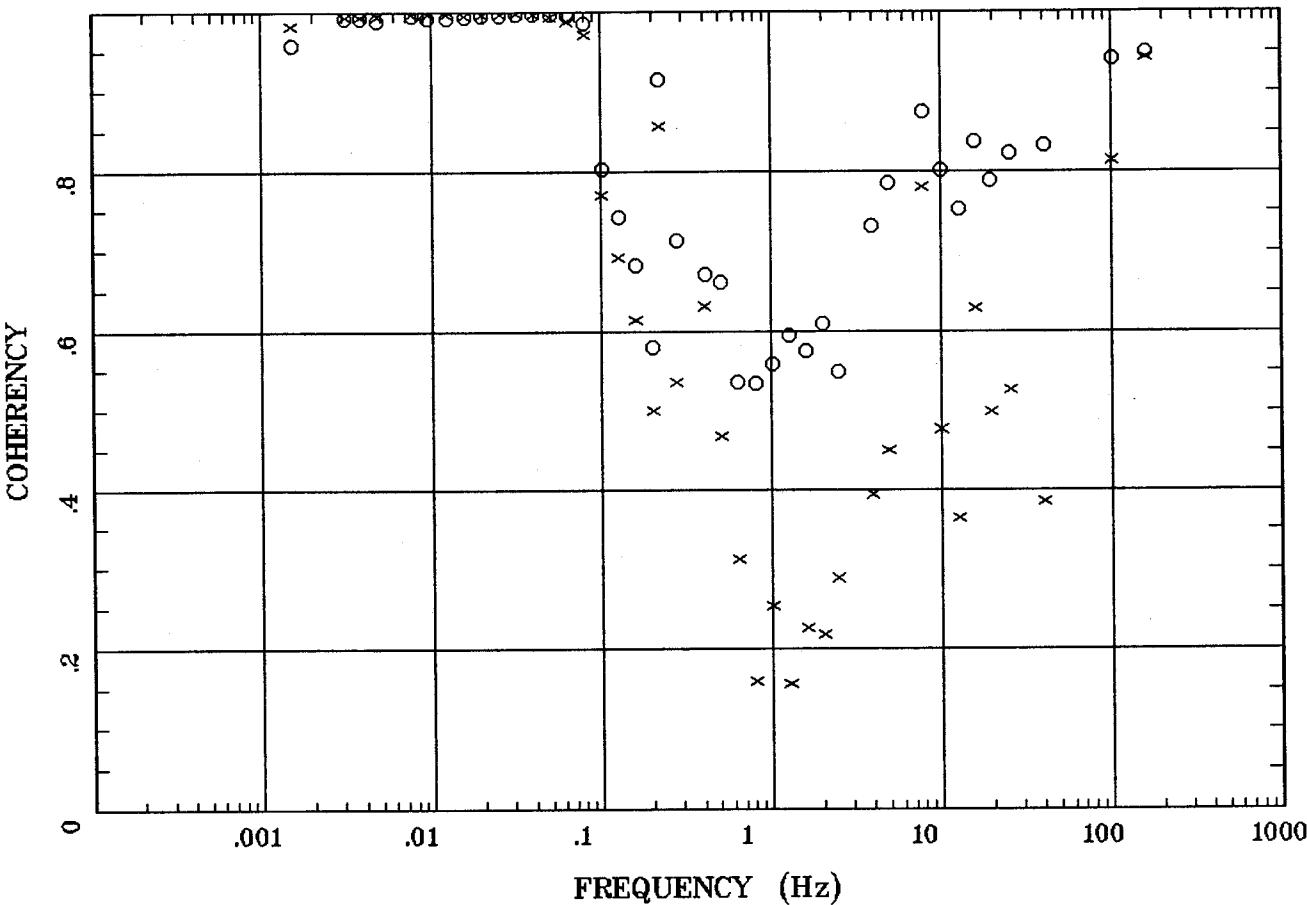
## IMPEDANCE SKEW



Client:  
Remote:  
Acquired: 19:5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s48afed.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 10:20 Dec 13, 2004  
< EMI - ElectroMagnetic Instruments >

## E MULT Coh.



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

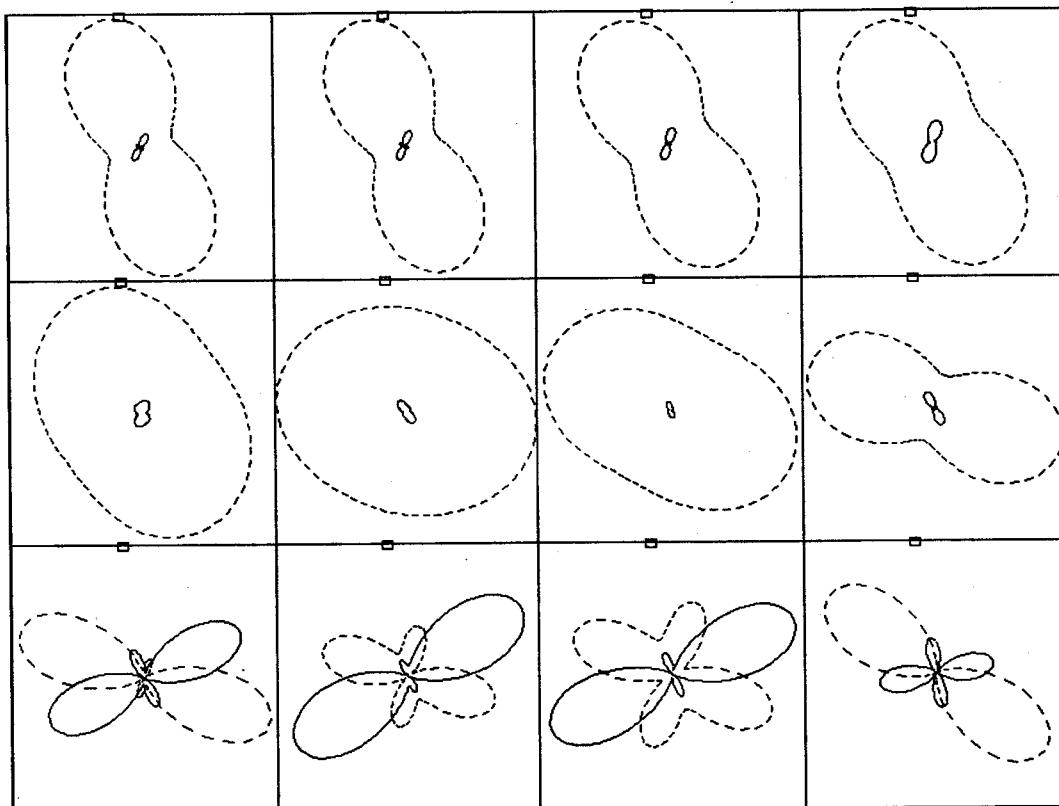
Filename: s48afed.avg

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 10:20 Dec 13, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## POLAR PLOTS



.0015 Hz  
.0629 Hz  
1.607 Hz

.0048 Hz  
.160 Hz  
3.906 Hz

.0122 Hz  
.278 Hz  
12.695 Hz

.0317 Hz  
.639 Hz  
25.391 Hz

## Rotation:

Filename: s48afed.avg

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 10:20 Dec 13, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

Client:

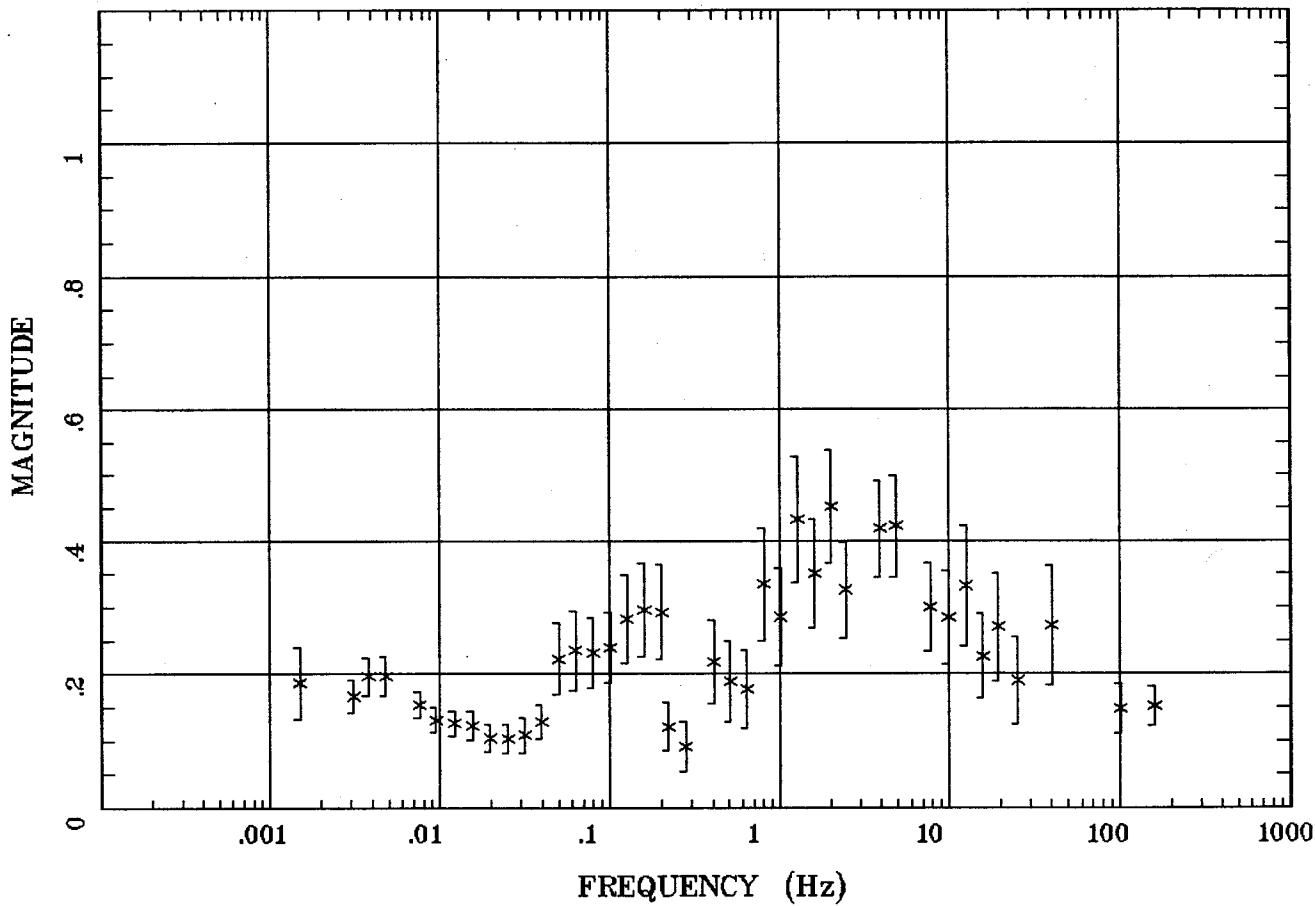
Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

# Station 48

## TIPPER MAGNITUDE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

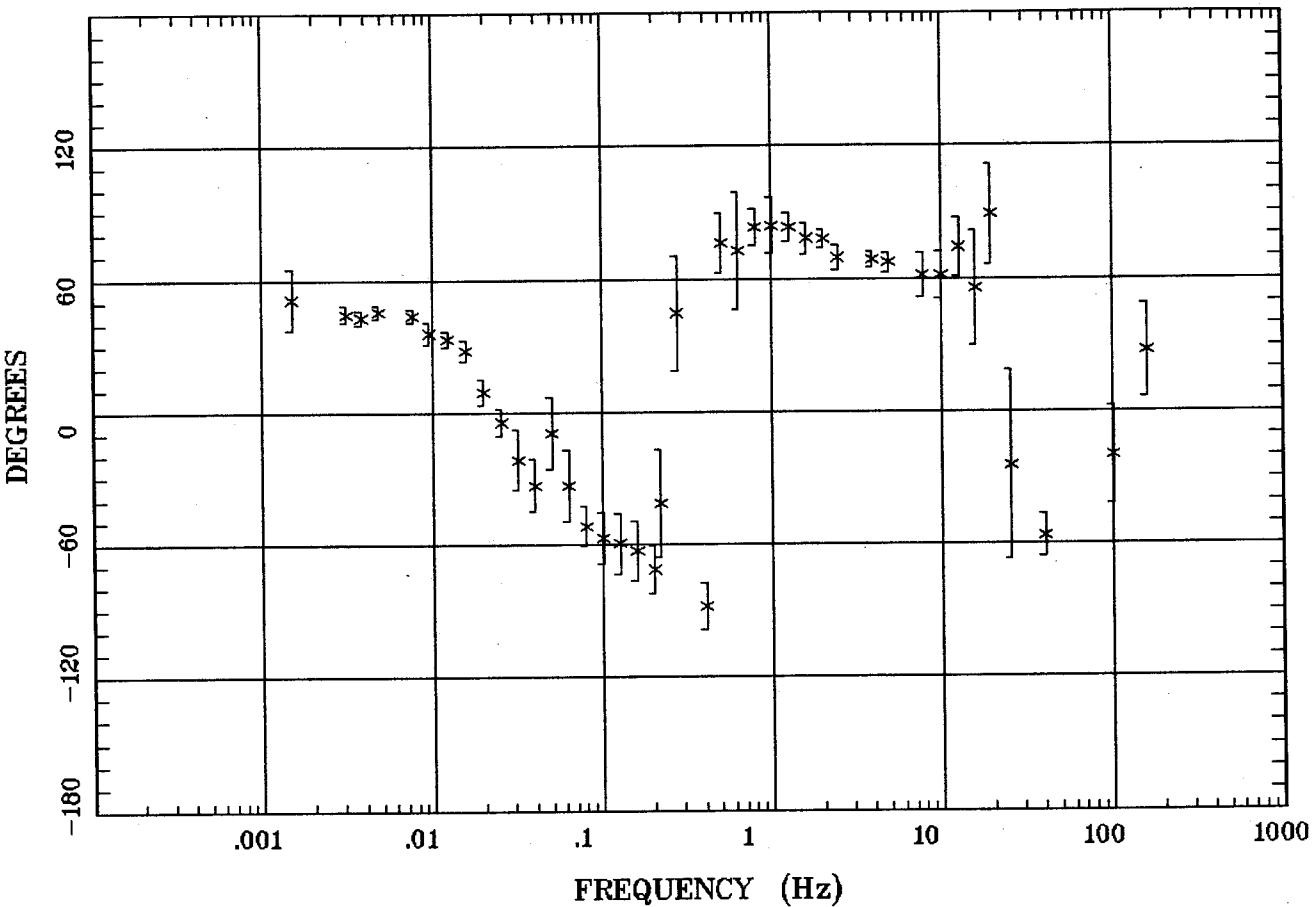
Filename: s48afed.avg

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 10:20 Dec 13, 2004

< EMI - ElectroMagnetic Instruments >

## TIPPER STRIKE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

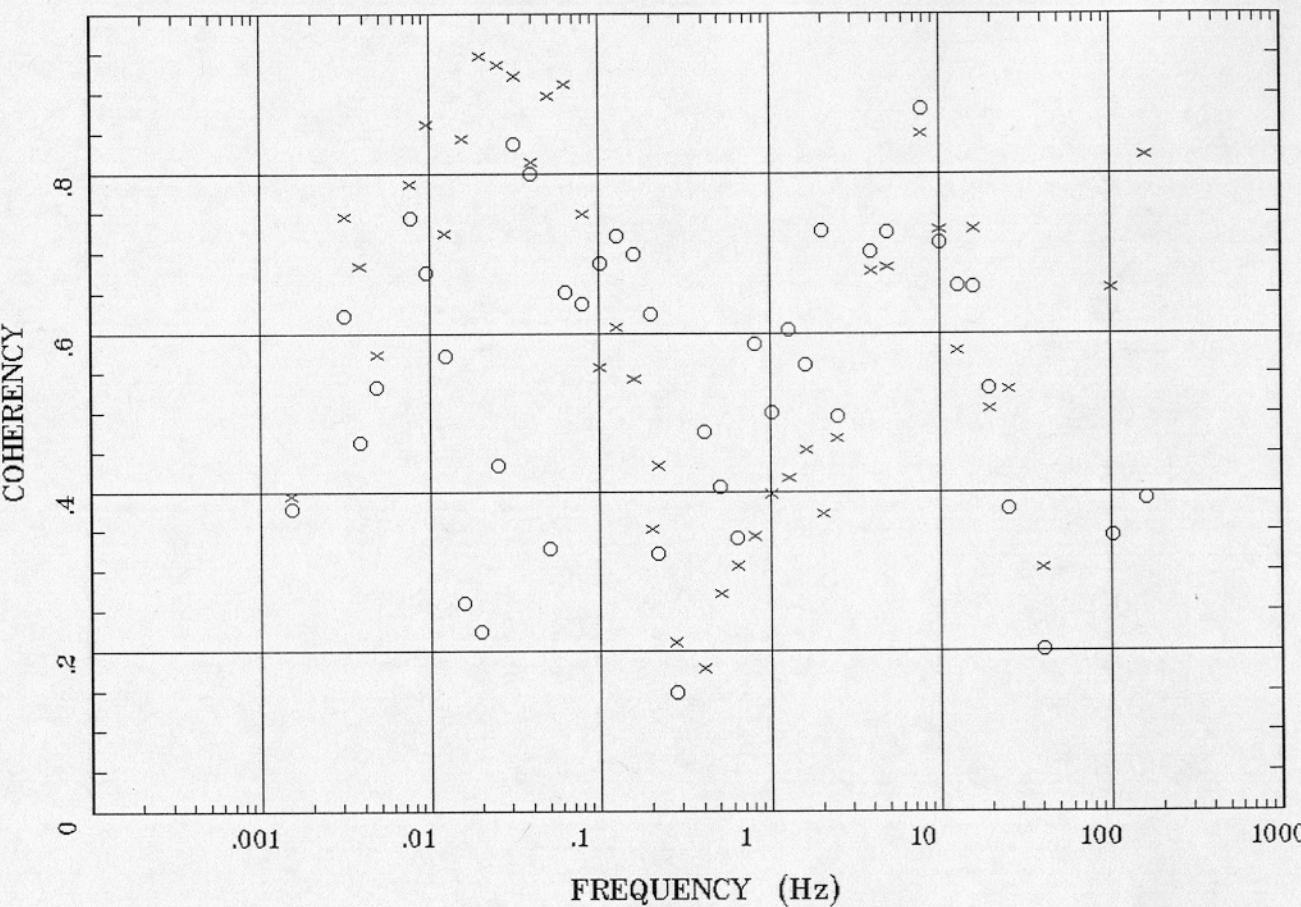
Filename: s48afed.avg

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 10:20 Dec 13, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

HzHx.x Coh HzHy.o



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

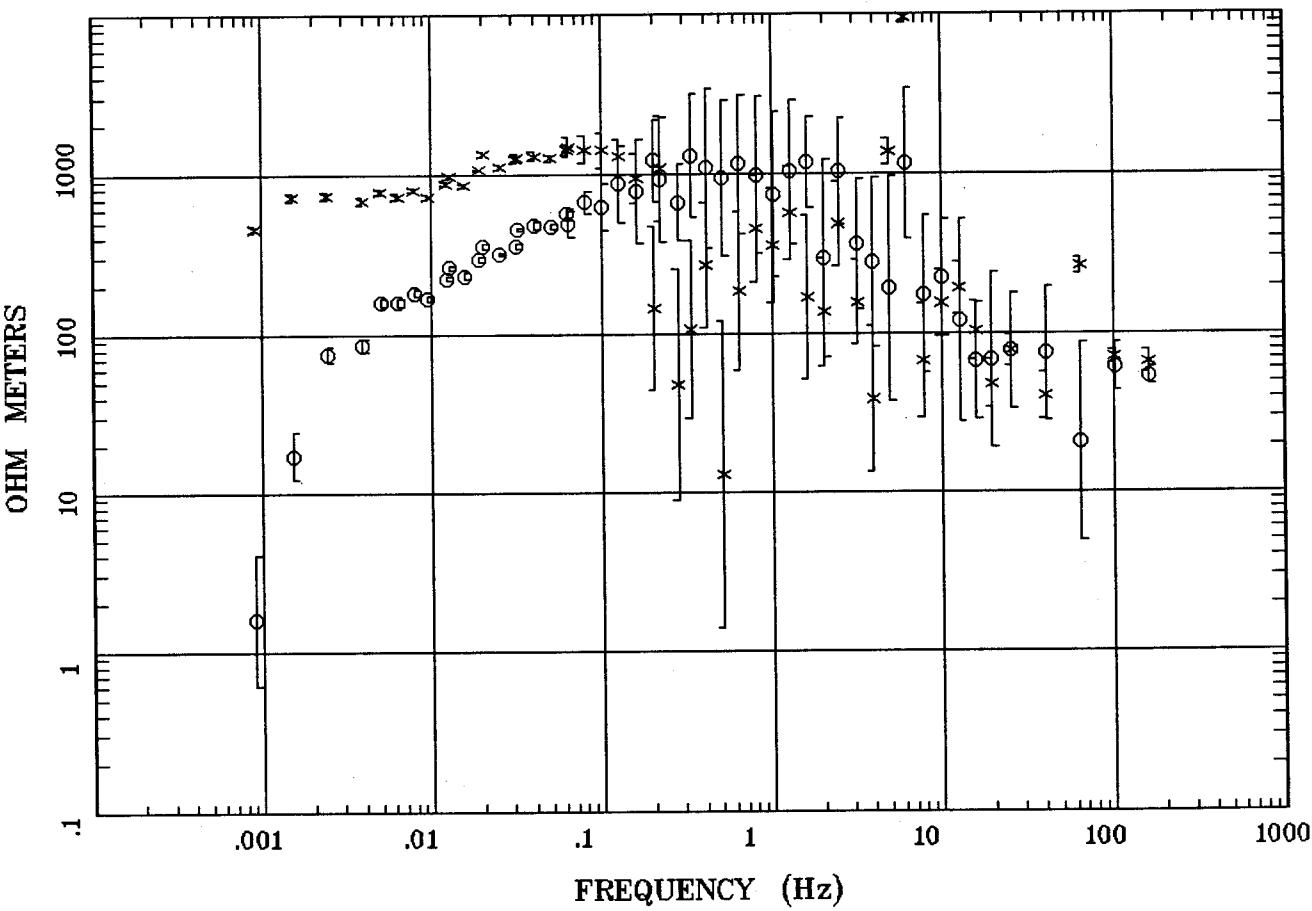
Filename: s48afed.avg

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 10:20 Dec 13, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## APPARENT RESISTIVITY



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

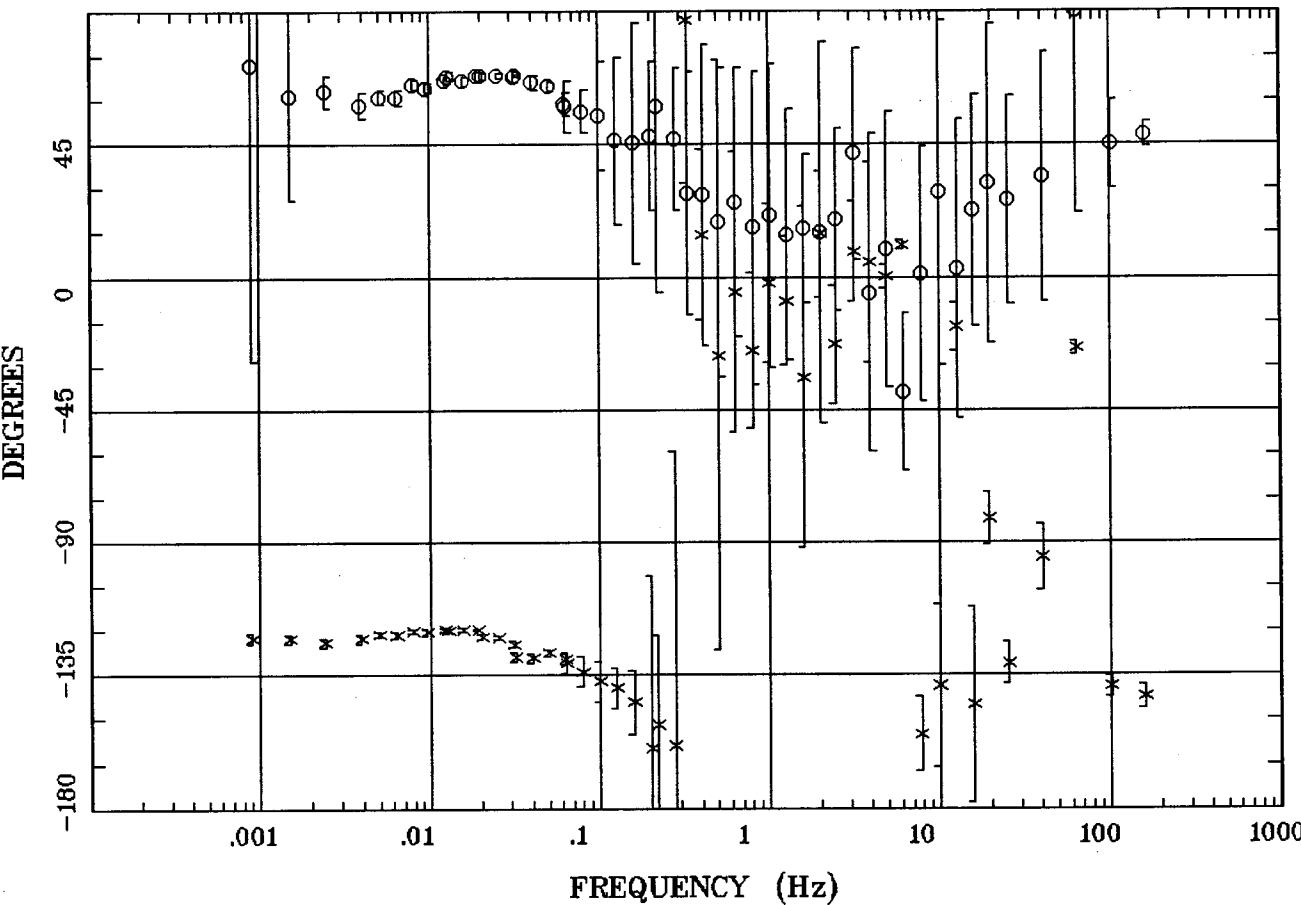
Filename: s49r12.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:16 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## IMPEDANCE PHASE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

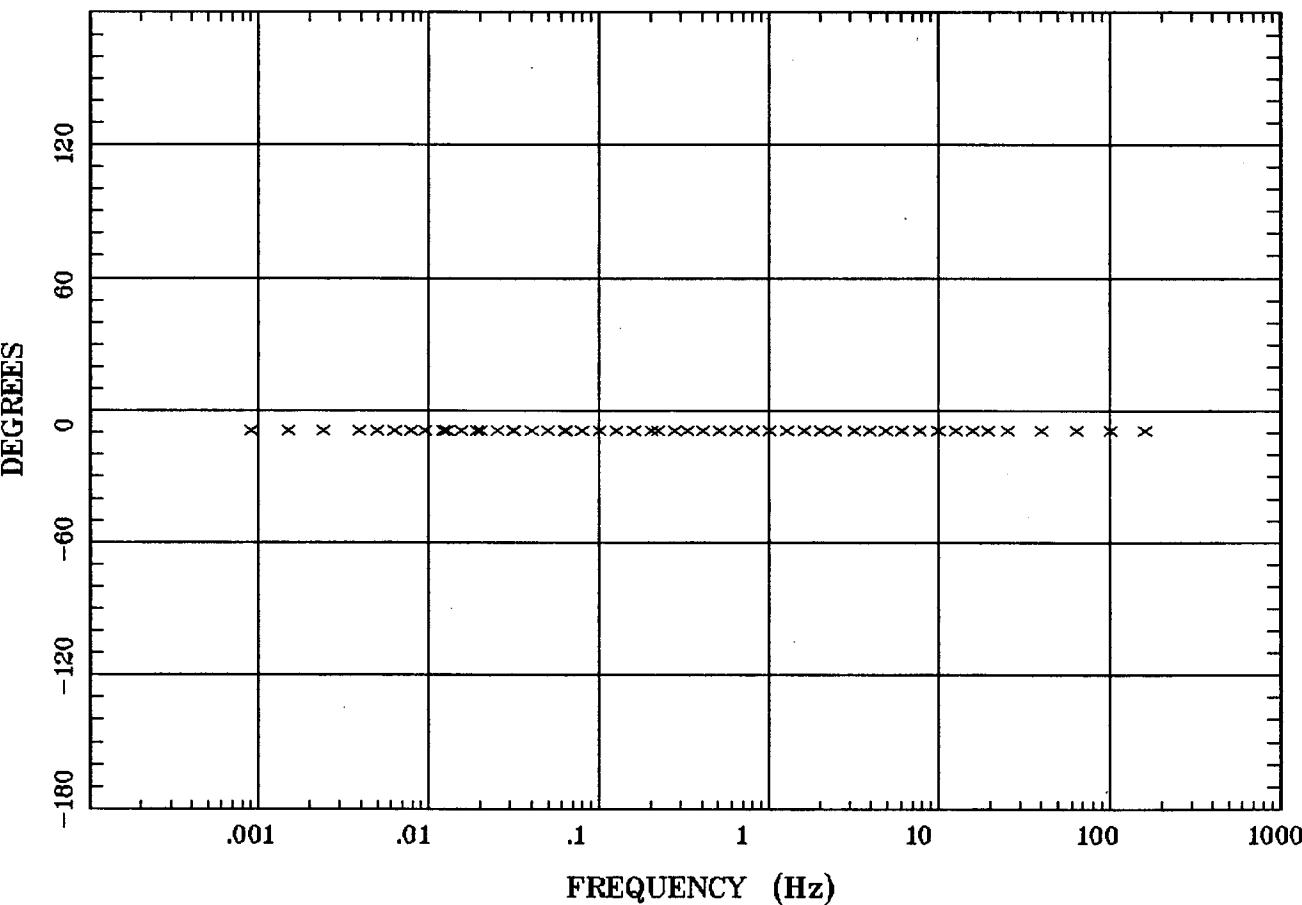
Filename: s49r12.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:16 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

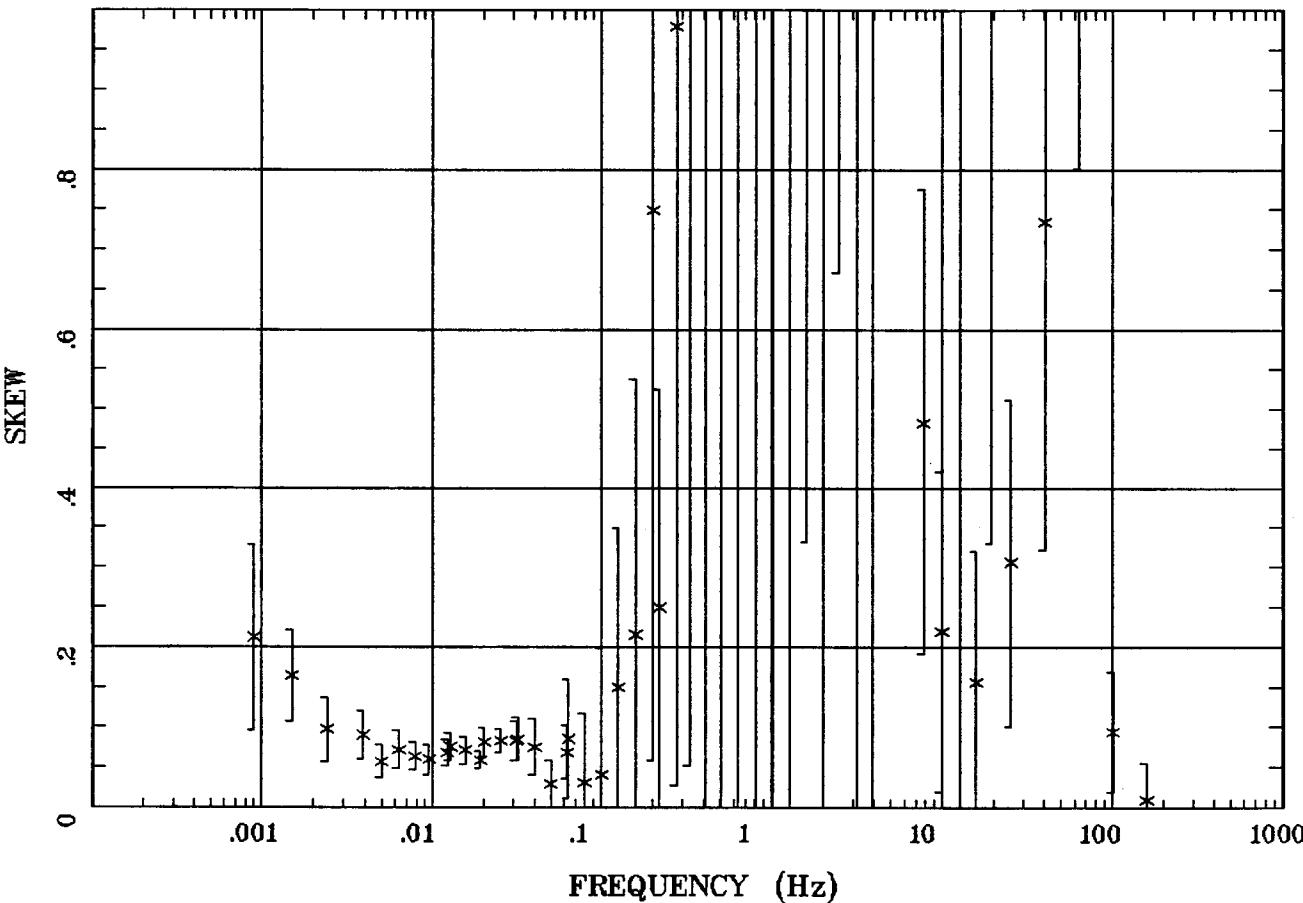
## ROTATION ANGLE



Client:  
Remote:  
Acquired: 19.5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s49r12.a02  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 13:16 Dec 08, 2004  
< EMI - ElectroMagnetic Instruments >

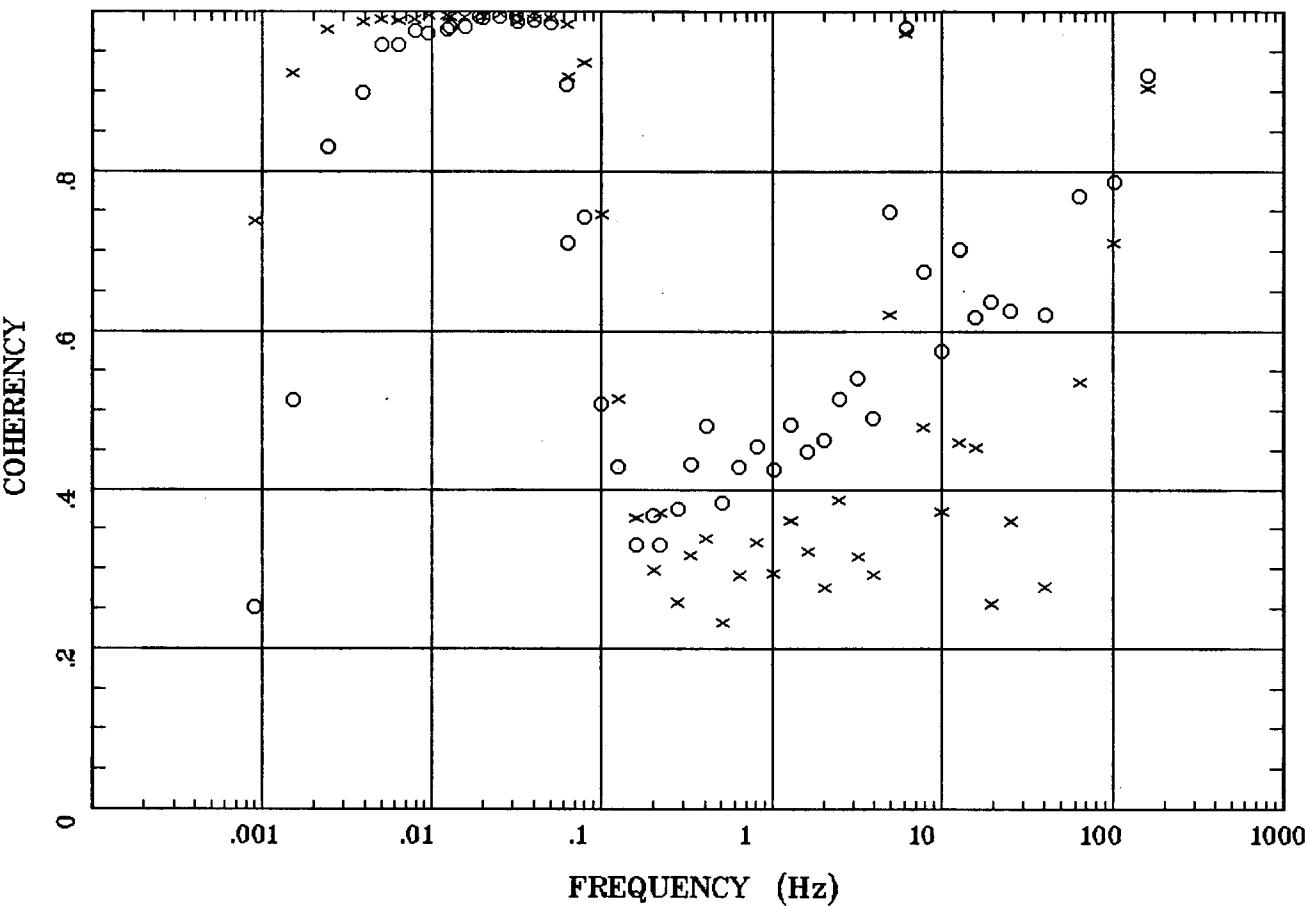
## IMPEDANCE SKEW



Client:  
Remote:  
Acquired: 19:5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s49r12.a02  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 13:16 Dec 08, 2004  
< EMI - ElectroMagnetic Instruments >

## E MULT Coh.



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

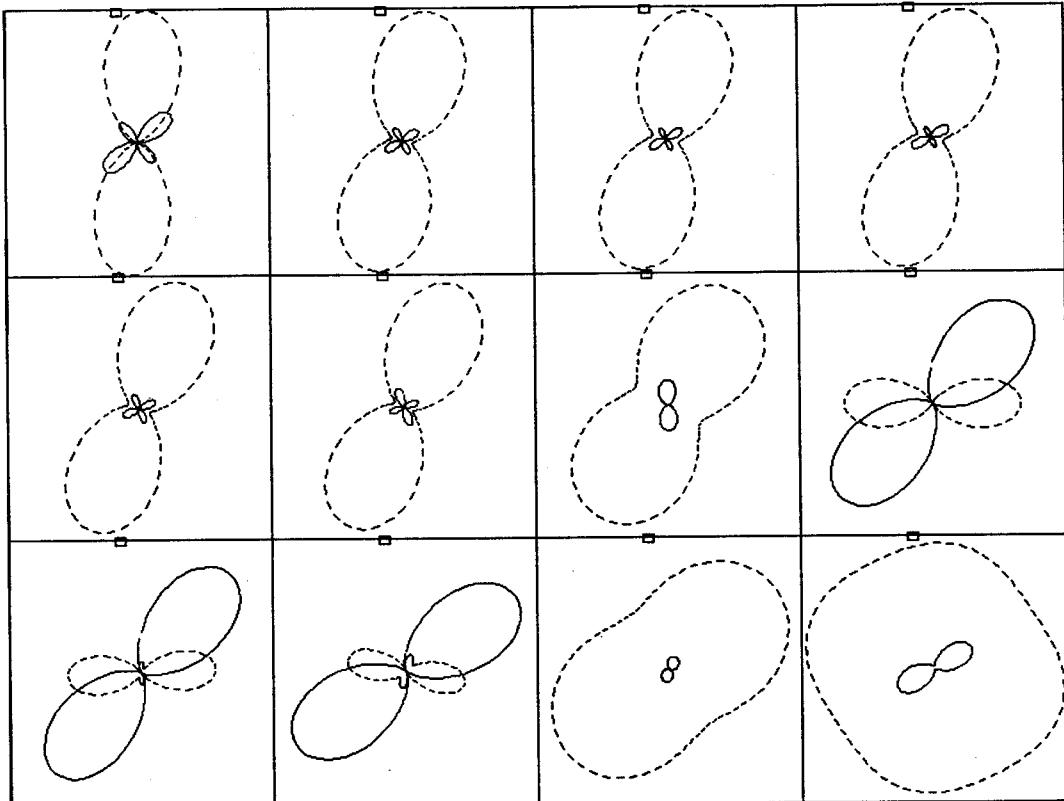
Filename: s49r12.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:16 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## POLAR PLOTS



.0009 Hz  
.0500 Hz  
1.606 Hz

.0050 Hz  
.0999 Hz  
3.906 Hz

.0122 Hz  
.220 Hz  
10.010 Hz

.0201 Hz  
.507 Hz  
25.391 Hz

Rotation:

Filename: s49r12.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:16 Dec 08, 2004

< EMI - ElectroMagnetic Instruments >

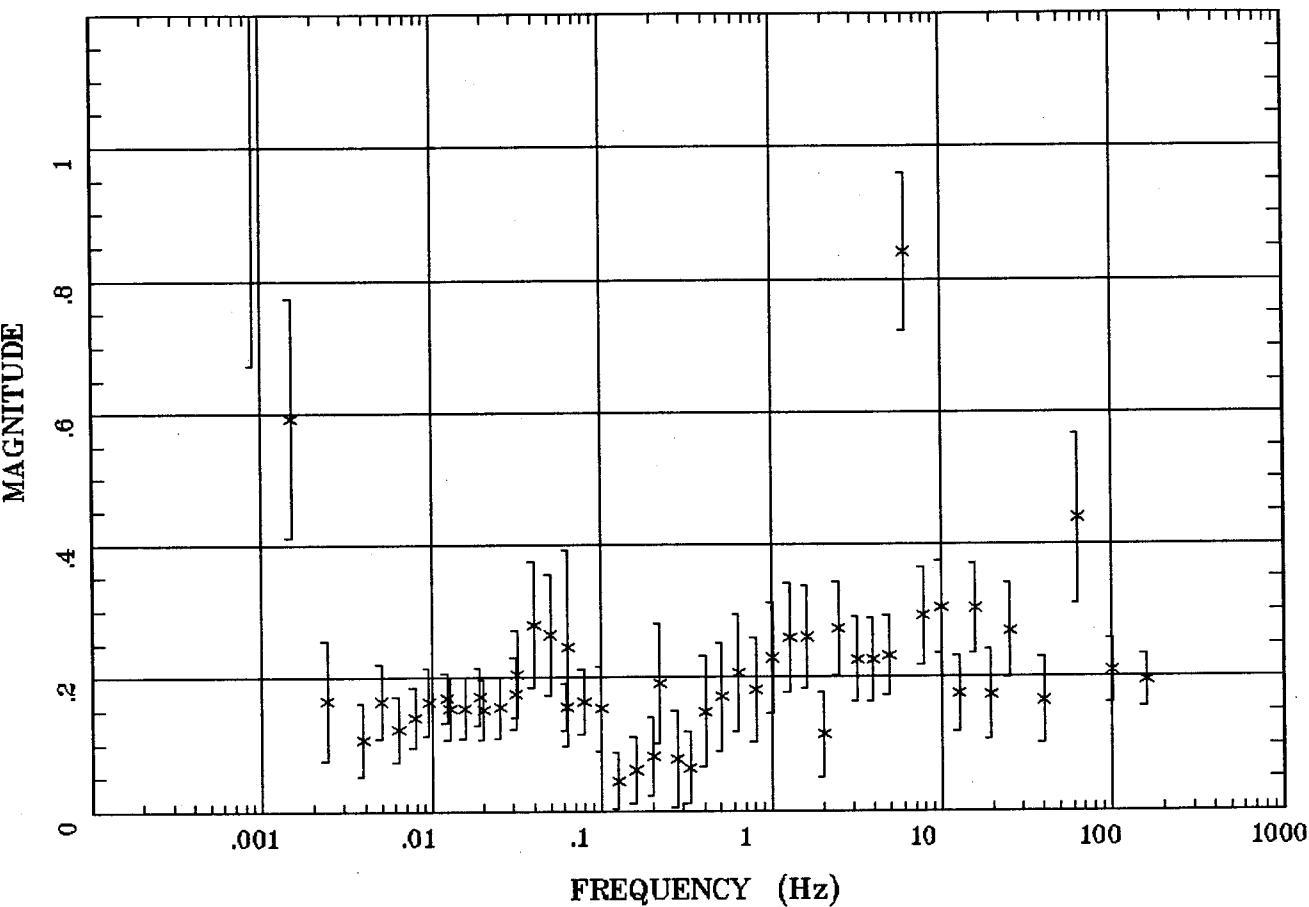
Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

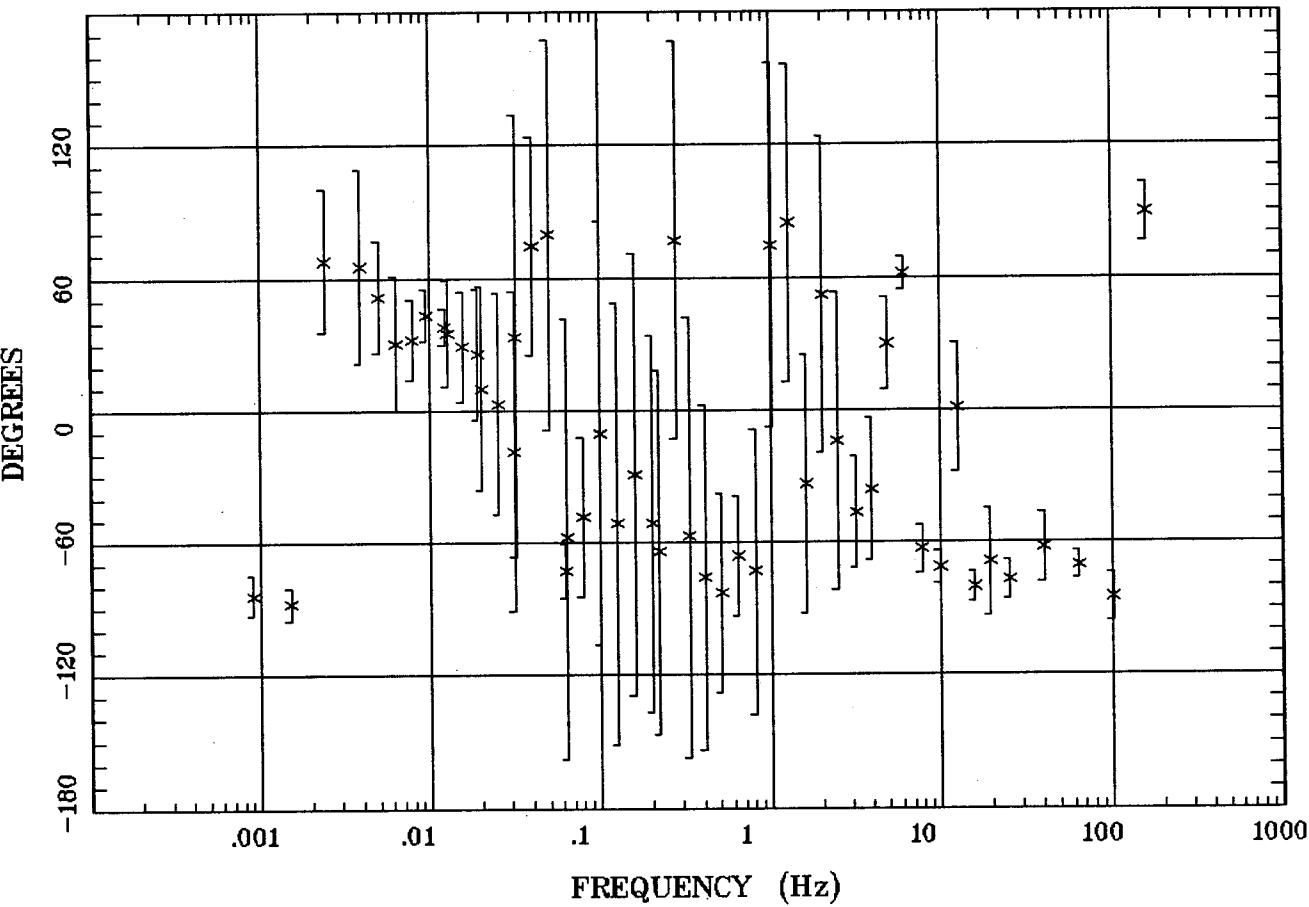
## TIPPER MAGNITUDE



Client:  
Remote:  
Acquired: 19:5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s49r12.a02  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 13:16 Dec 08, 2004  
< EMI - ElectroMagnetic Instruments >

## TIPPER STRIKE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

Filename: s49r12.a02

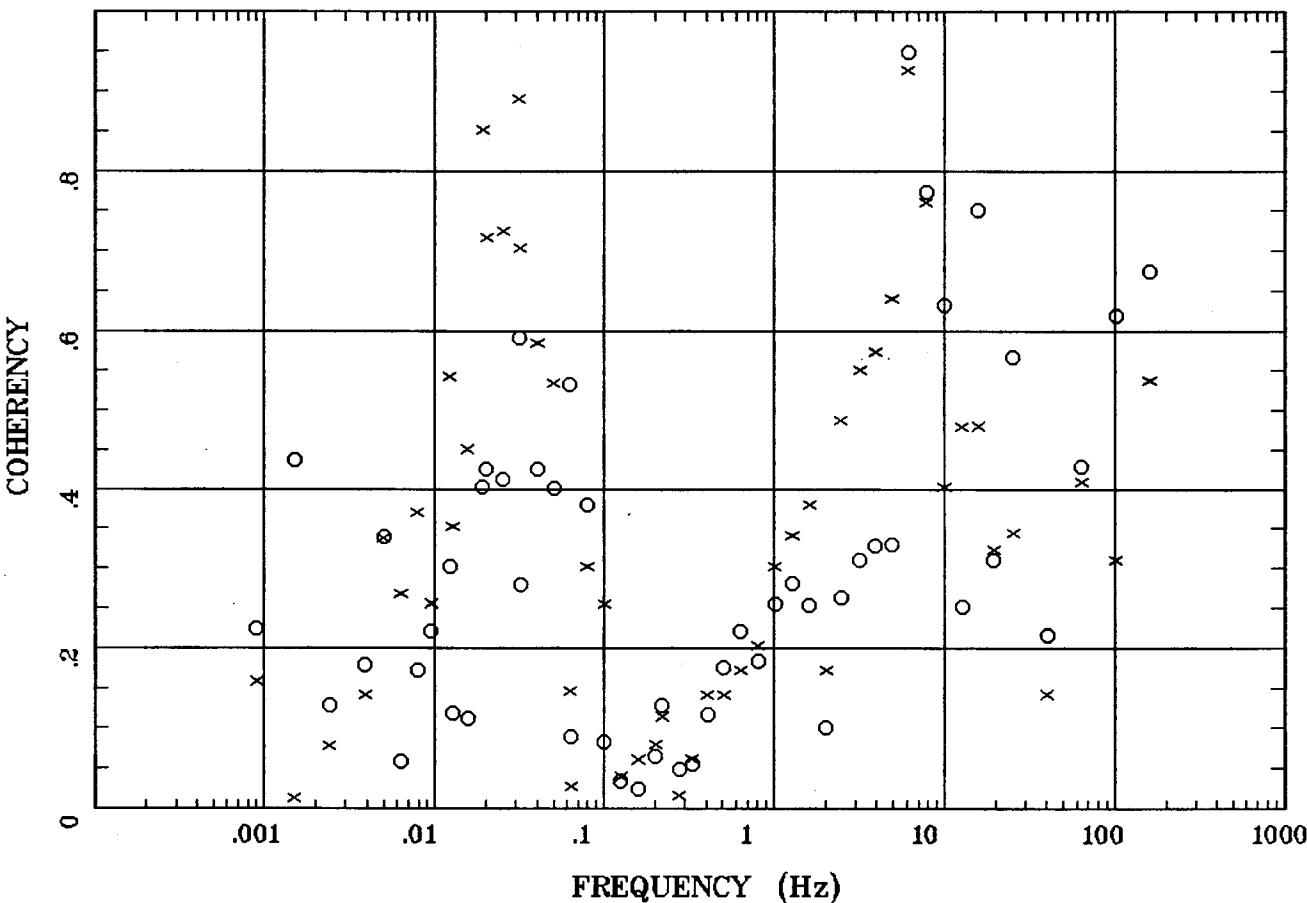
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:16 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

HzHx.x Coh HzHy.o

SL

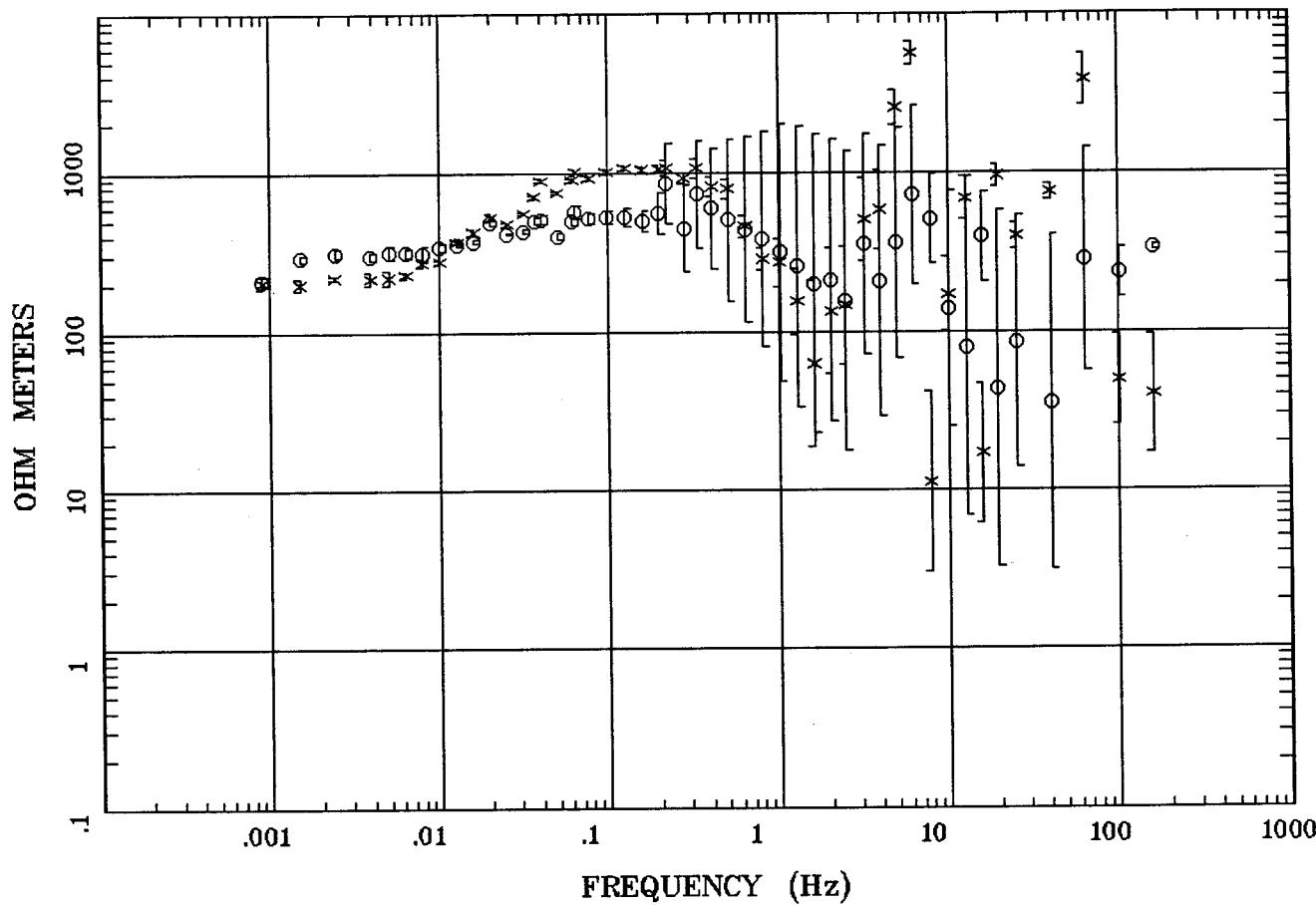


Client:  
Remote:  
Acquired: 19:5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s49r12.a02  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 13:16 Dec 08, 2004  
< EMI - ElectroMagnetic Instruments >

**Station 50**

**APPARENT RESISTIVITY**



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

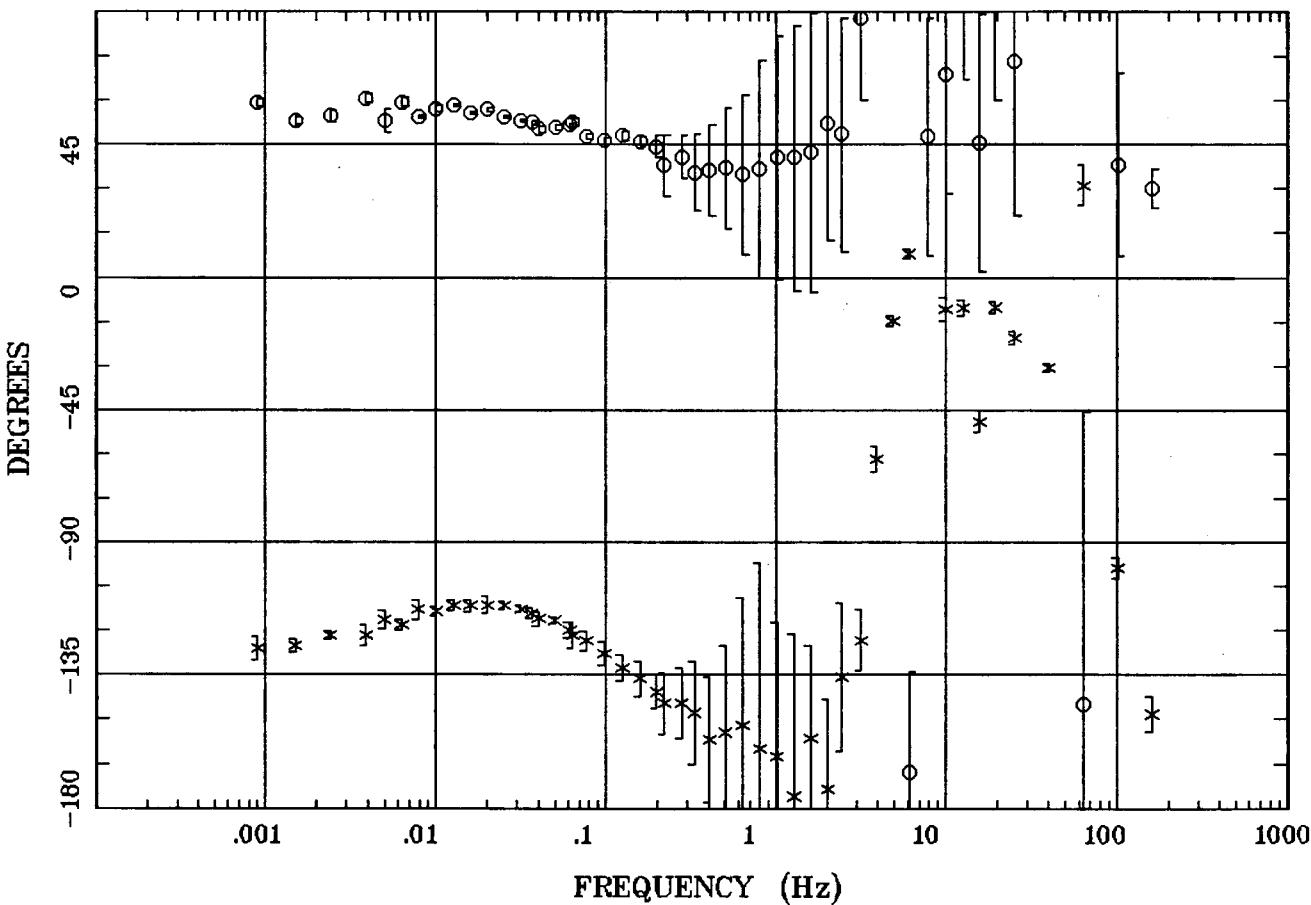
Filename: s50r11.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:17 Dec 08, 2004

< EMI - ElectroMagnetic Instruments >

## IMPEDANCE PHASE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

Filename: s50r11.a02

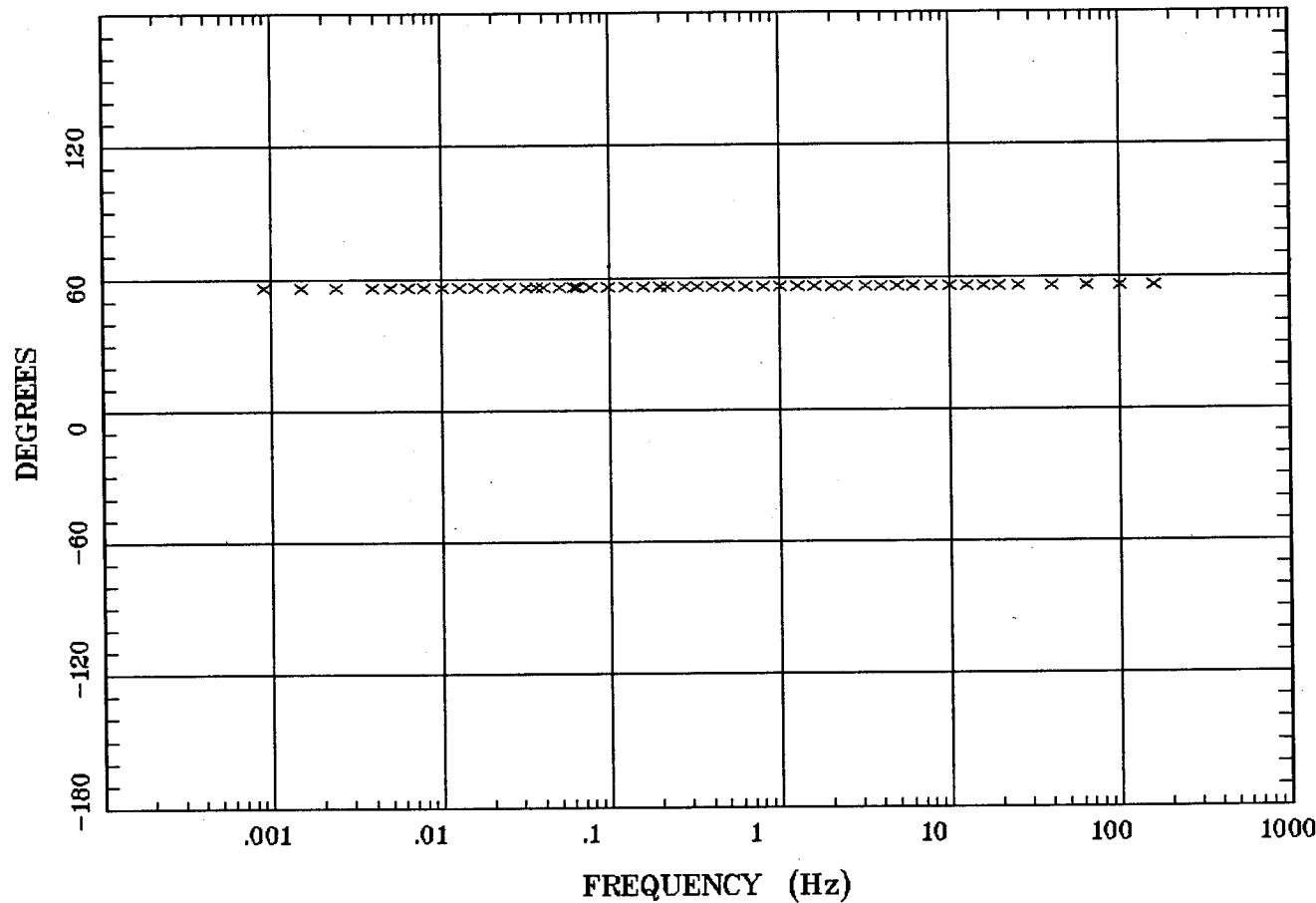
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:17 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

Station 50

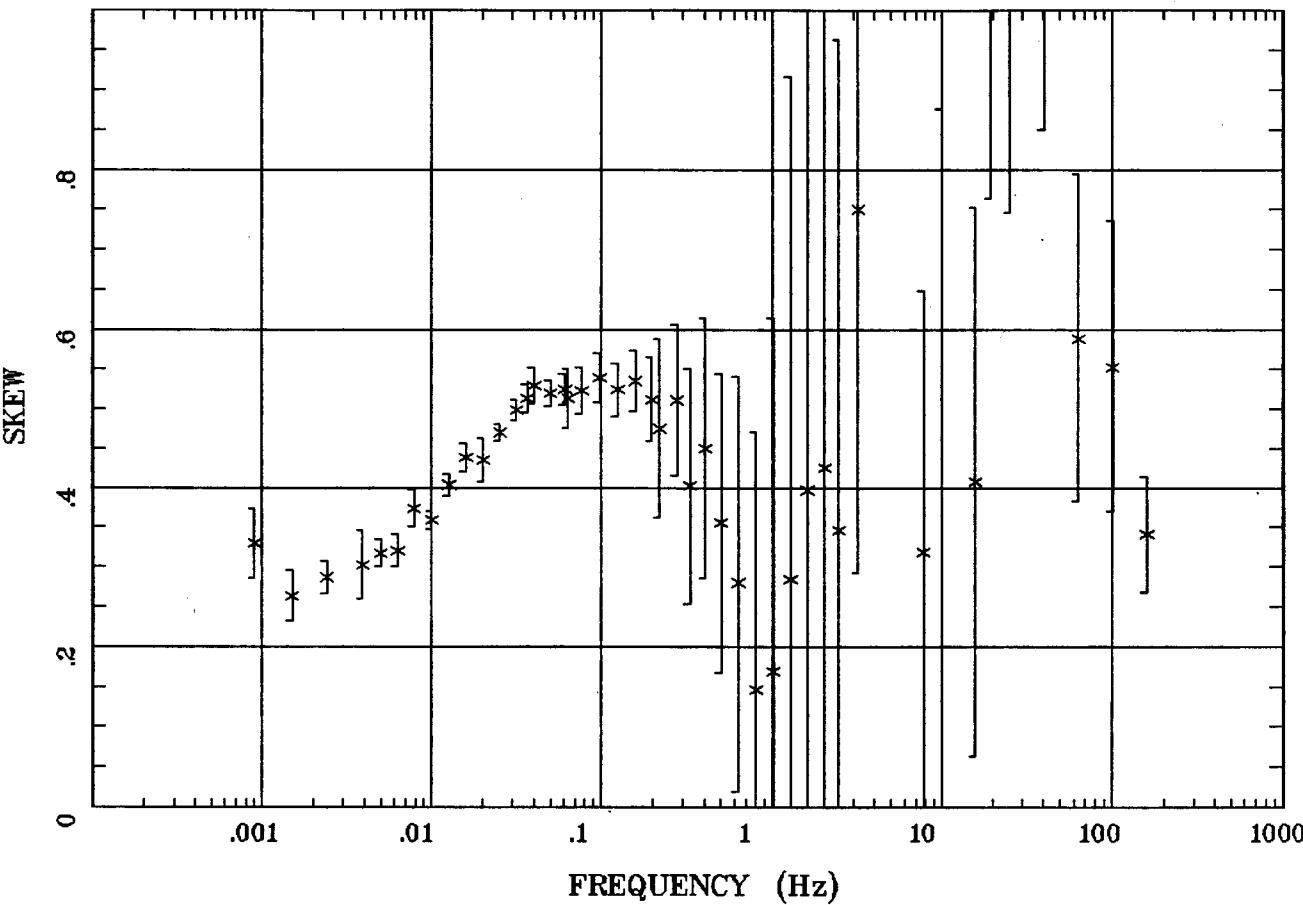
ROTATION ANGLE



Client:  
Remote:  
Acquired: 19:5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s50r11.a02  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 13:17 Dec 08, 2004  
< EMI - ElectroMagnetic Instruments >

## IMPEDANCE SKEW

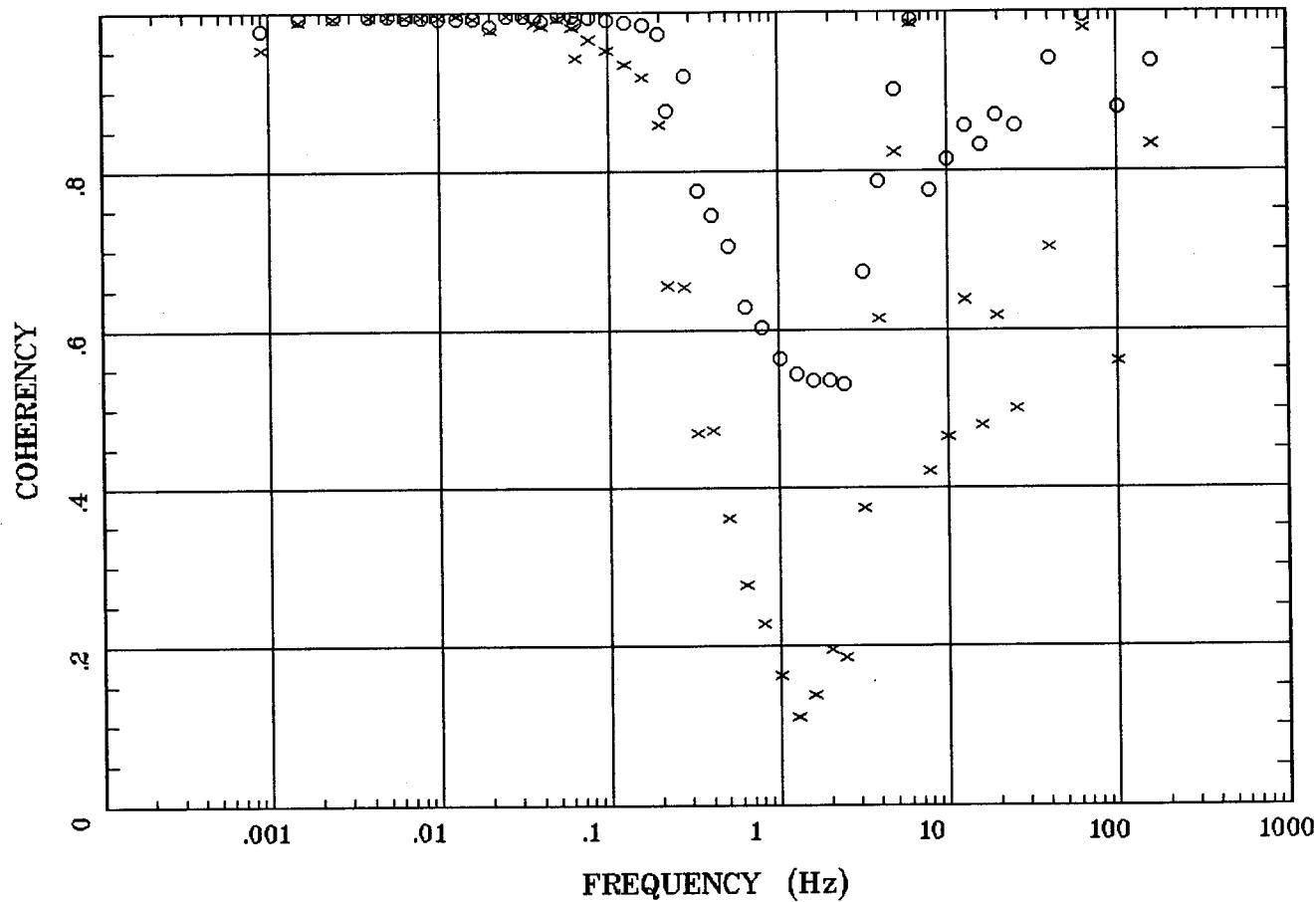


Client:  
Remote:  
Acquired: 19:5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s50r11.a02  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 13:17 Dec 08, 2004  
< EMI - ElectroMagnetic Instruments >

# Station 50

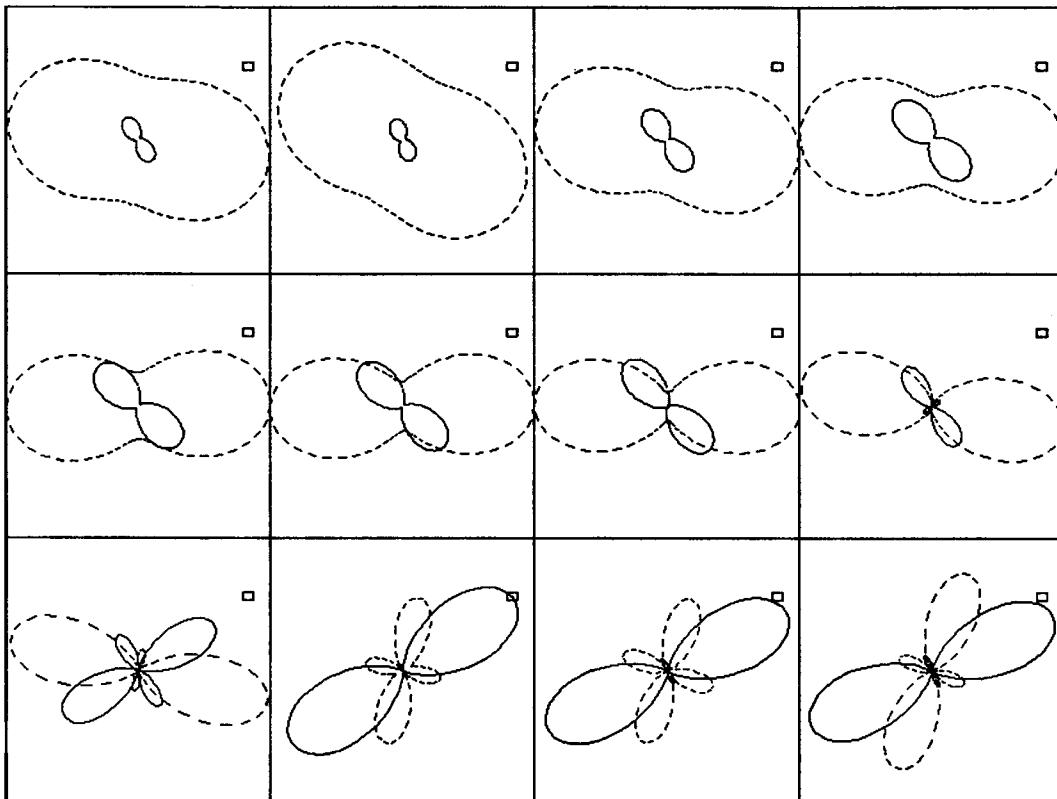
E MULT Coh.



08  
Client:  
Remote:  
Acquired: 19:5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s50r11.a02  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 13:17 Dec 08, 2004  
< EMI - ElectroMagnetic Instruments >

## POLAR PLOTS



.0009 Hz

.0610 Hz

1.602 Hz

.0050 Hz

.125 Hz

3.906 Hz

.0127 Hz

.278 Hz

10.010 Hz

.0317 Hz

.635 Hz

25.391 Hz

Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

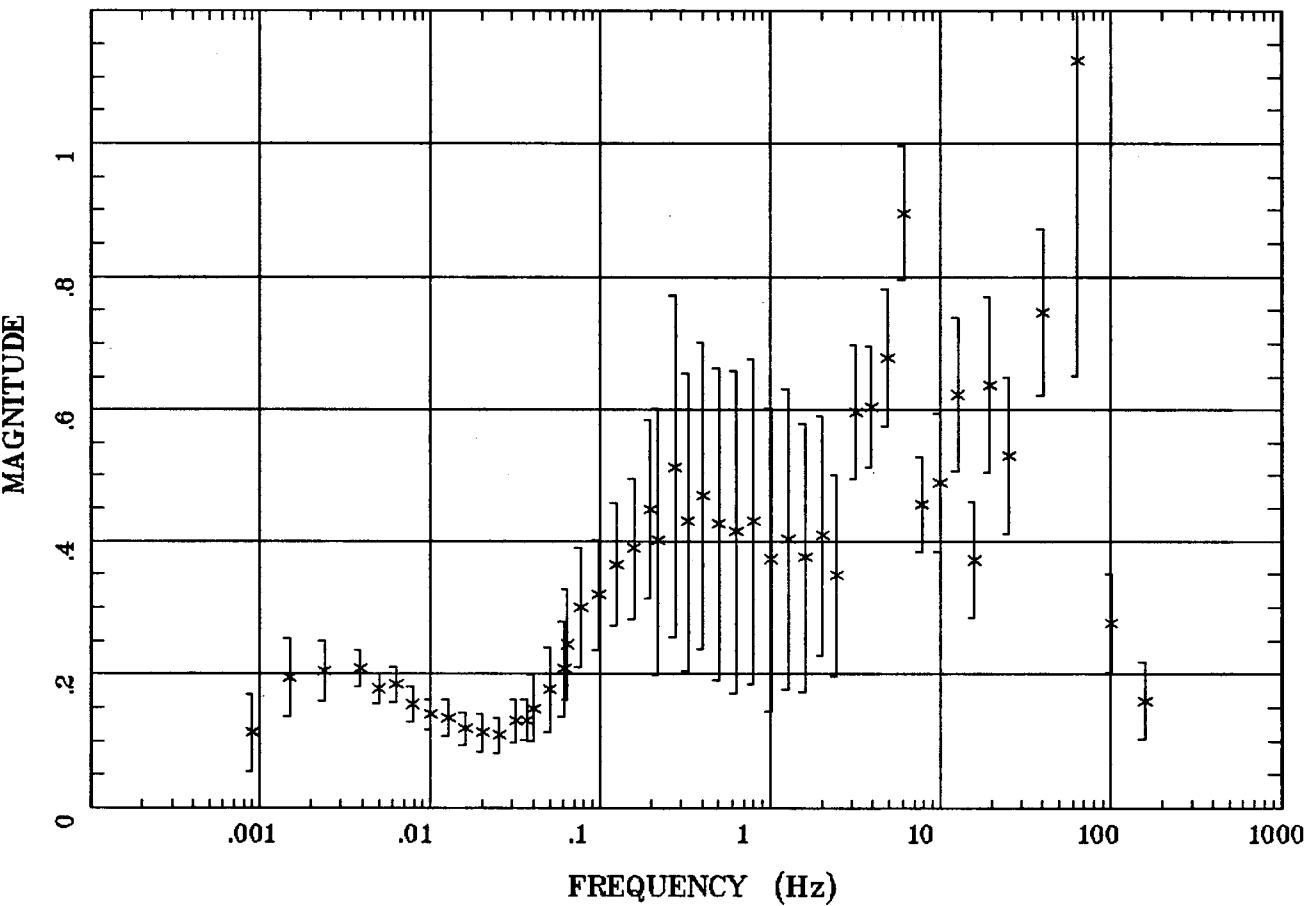
Filename: s50r11.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:17 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## TIPPER MAGNITUDE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

Filename: s50r11.a02

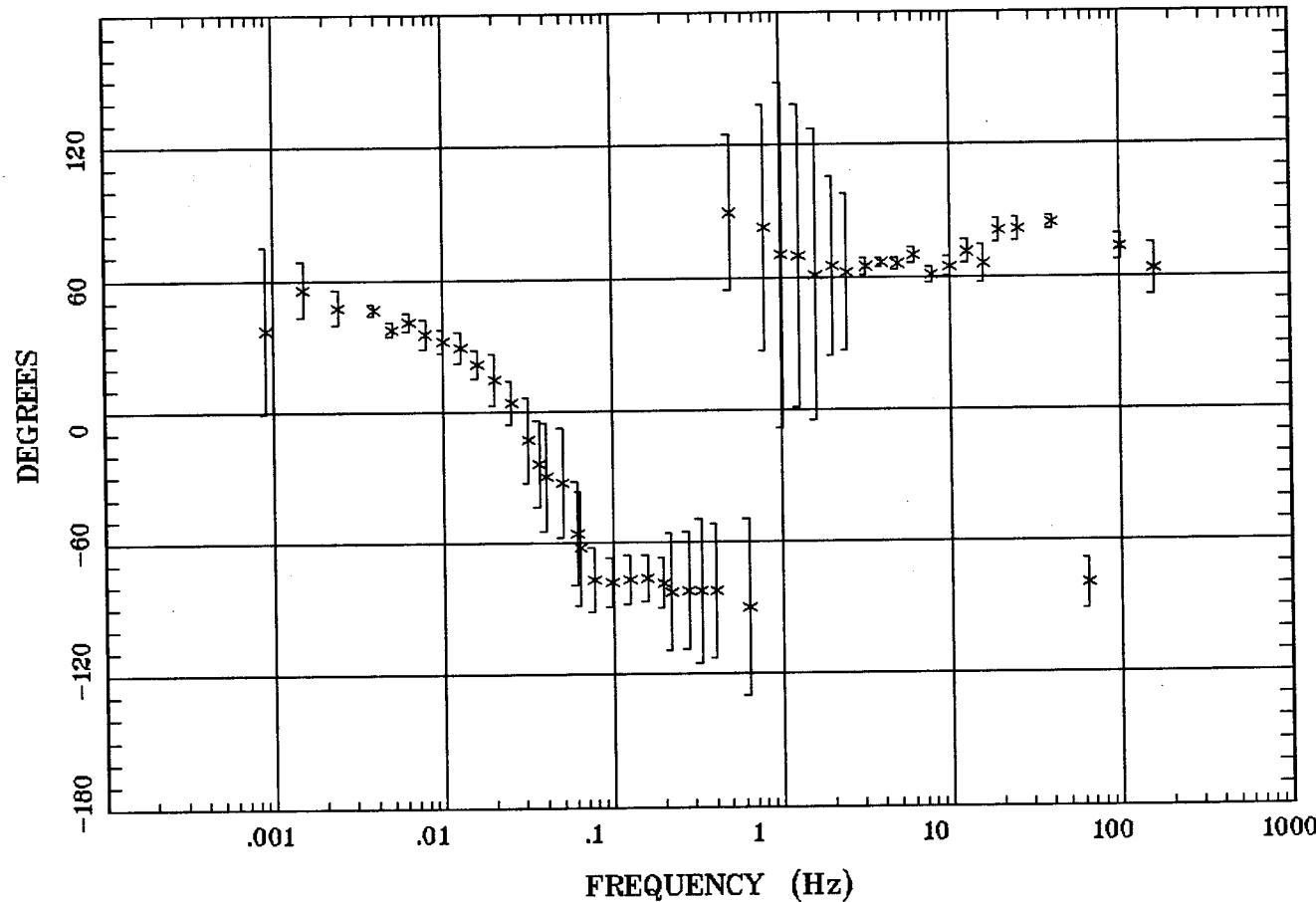
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:17 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

Station 50

TIPPER STRIKE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

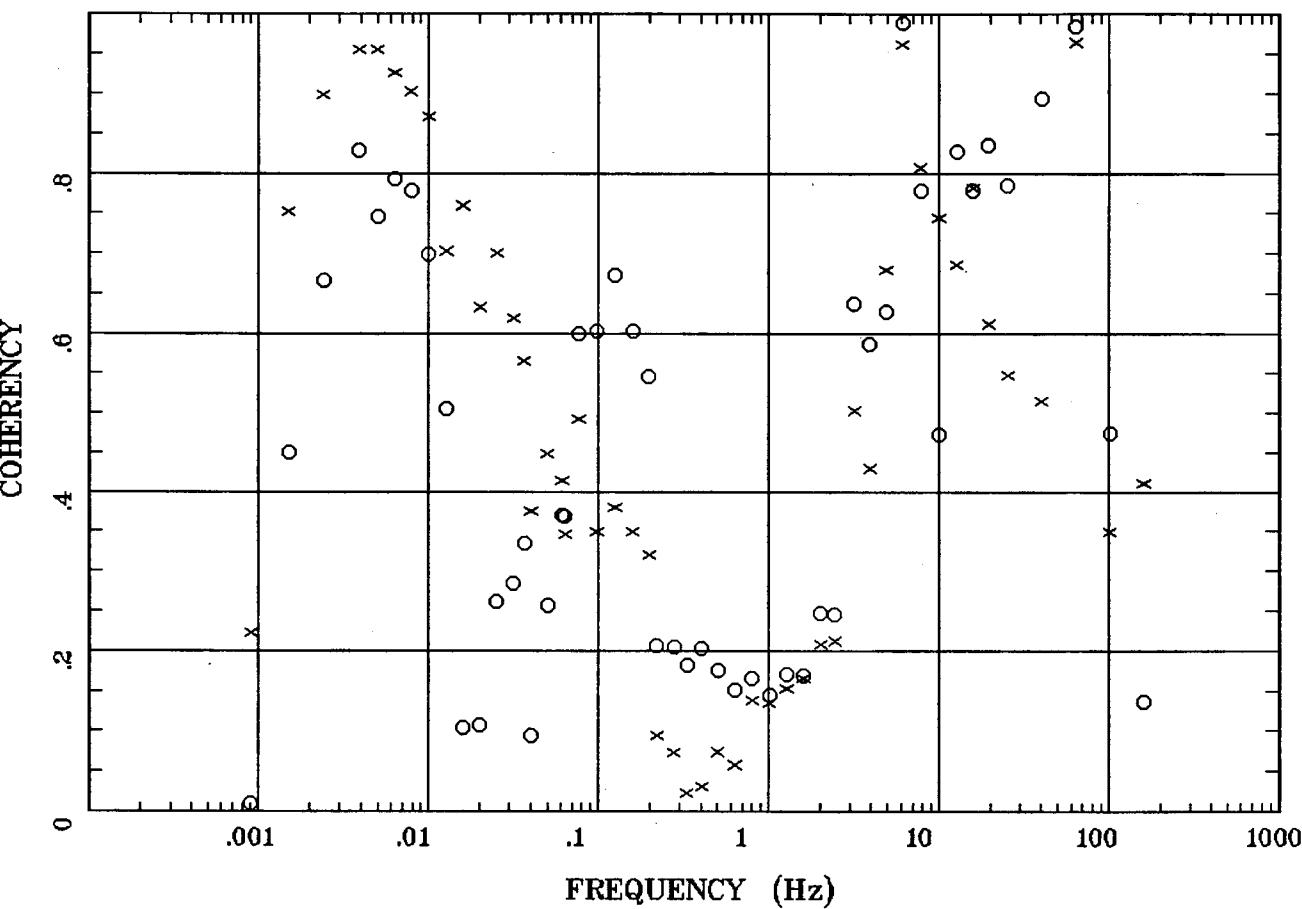
Filename: s50r11.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:17 Dec 08, 2004

< EMI - ElectroMagnetic Instruments >

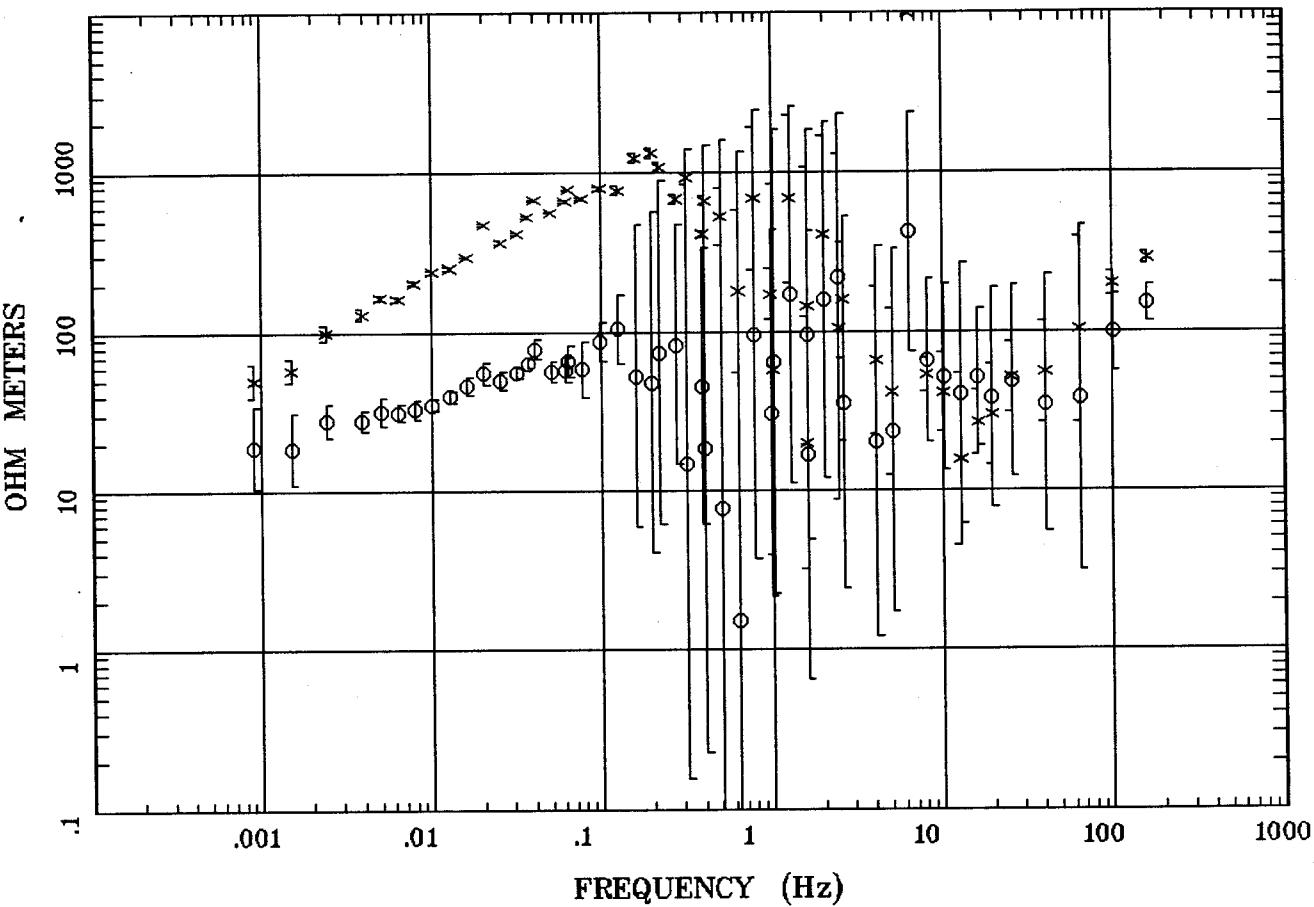
HzHx.x Coh HzHy.o



Client:  
Remote:  
Acquired: 19:5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s50r11.a02  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 13:17 Dec 08, 2004  
< EMI - ElectroMagnetic Instruments >

## APPARENT RESISTIVITY



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

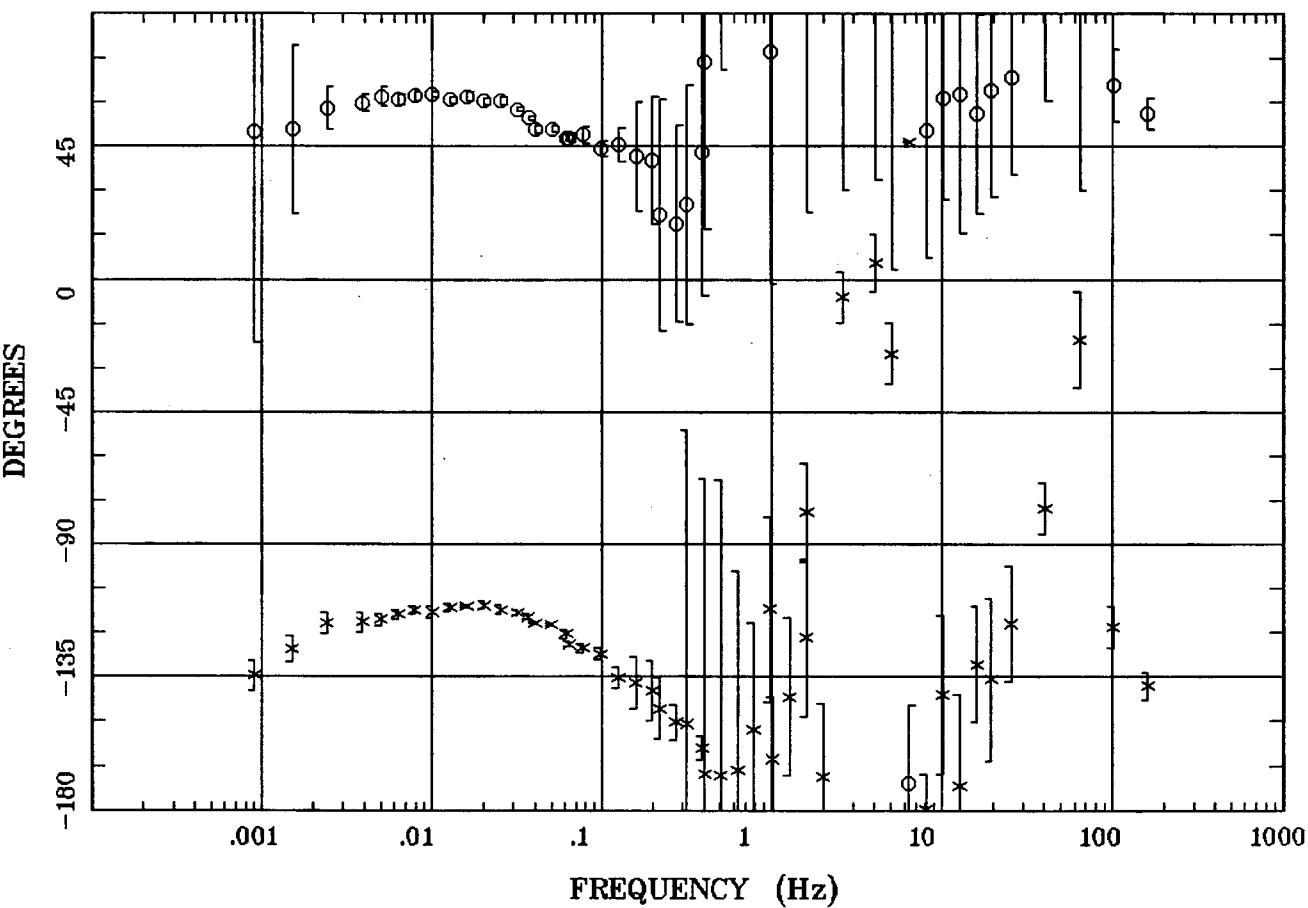
Filename: s51r15.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:18 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## IMPEDANCE PHASE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

Filename: s51r15.a02

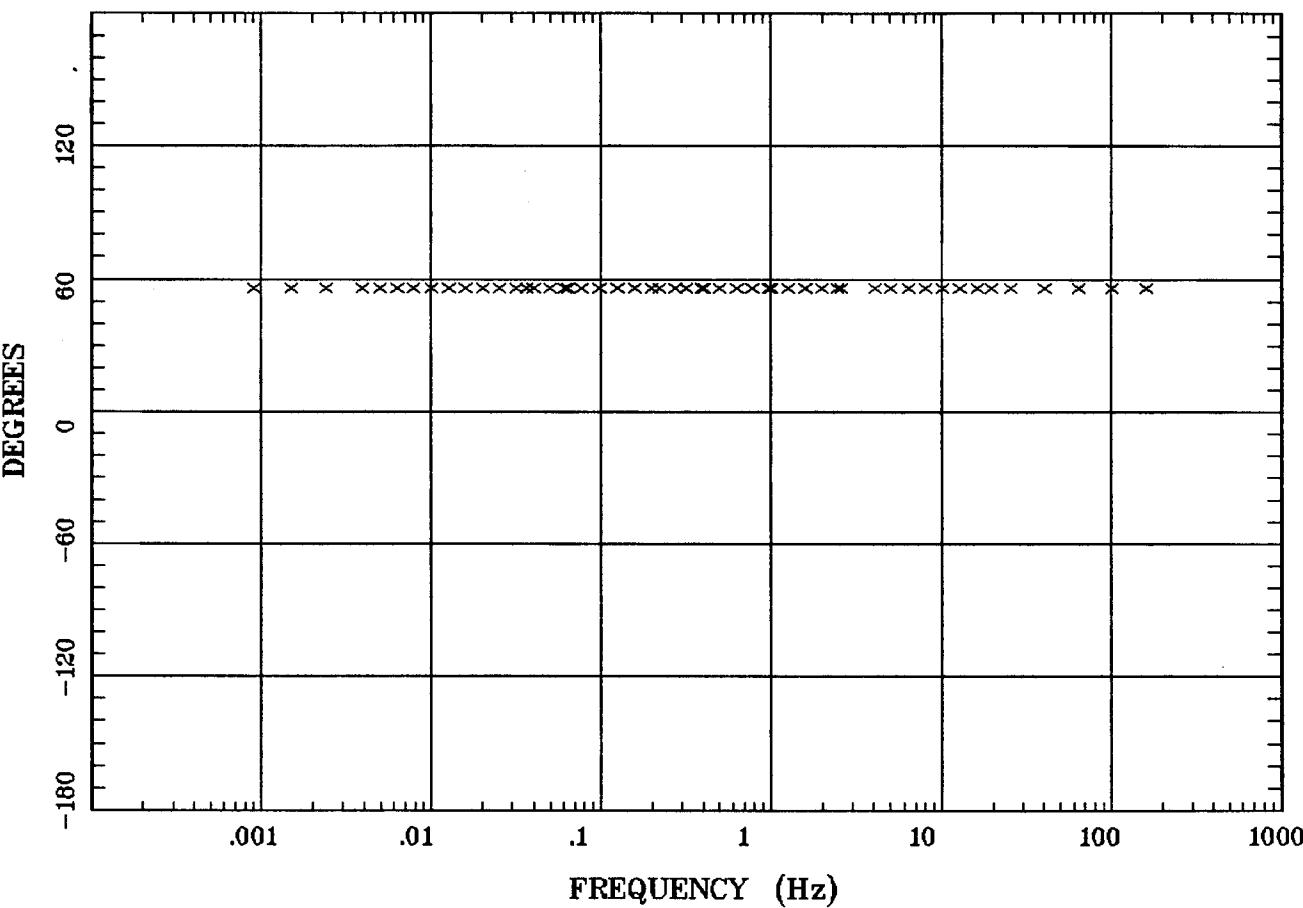
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:18 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## ROTATION ANGLE

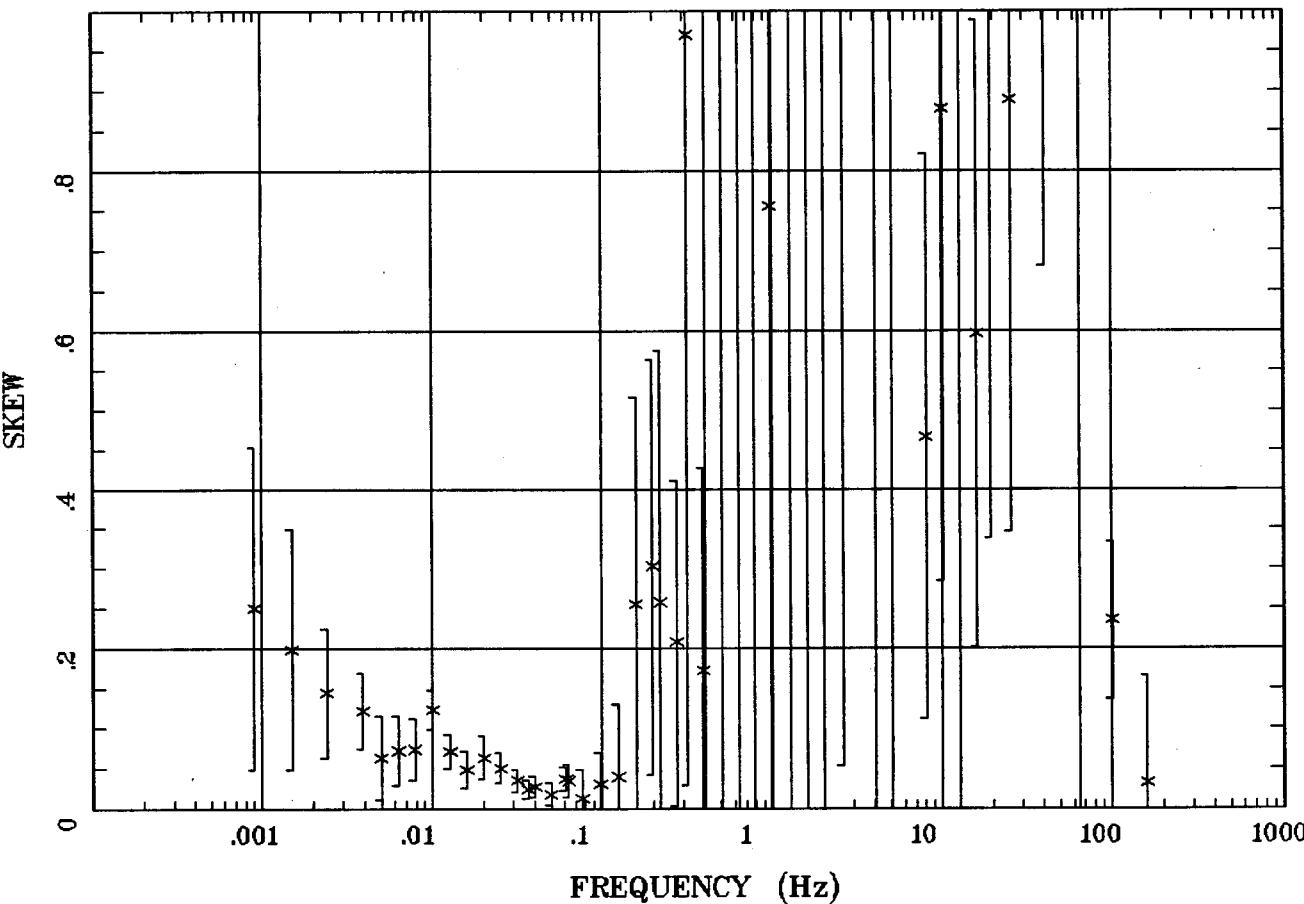
L8



Client:  
Remote:  
Acquired: 19.5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s51r15.a02  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 13:18 Dec 08, 2004  
< EMI - ElectroMagnetic Instruments >

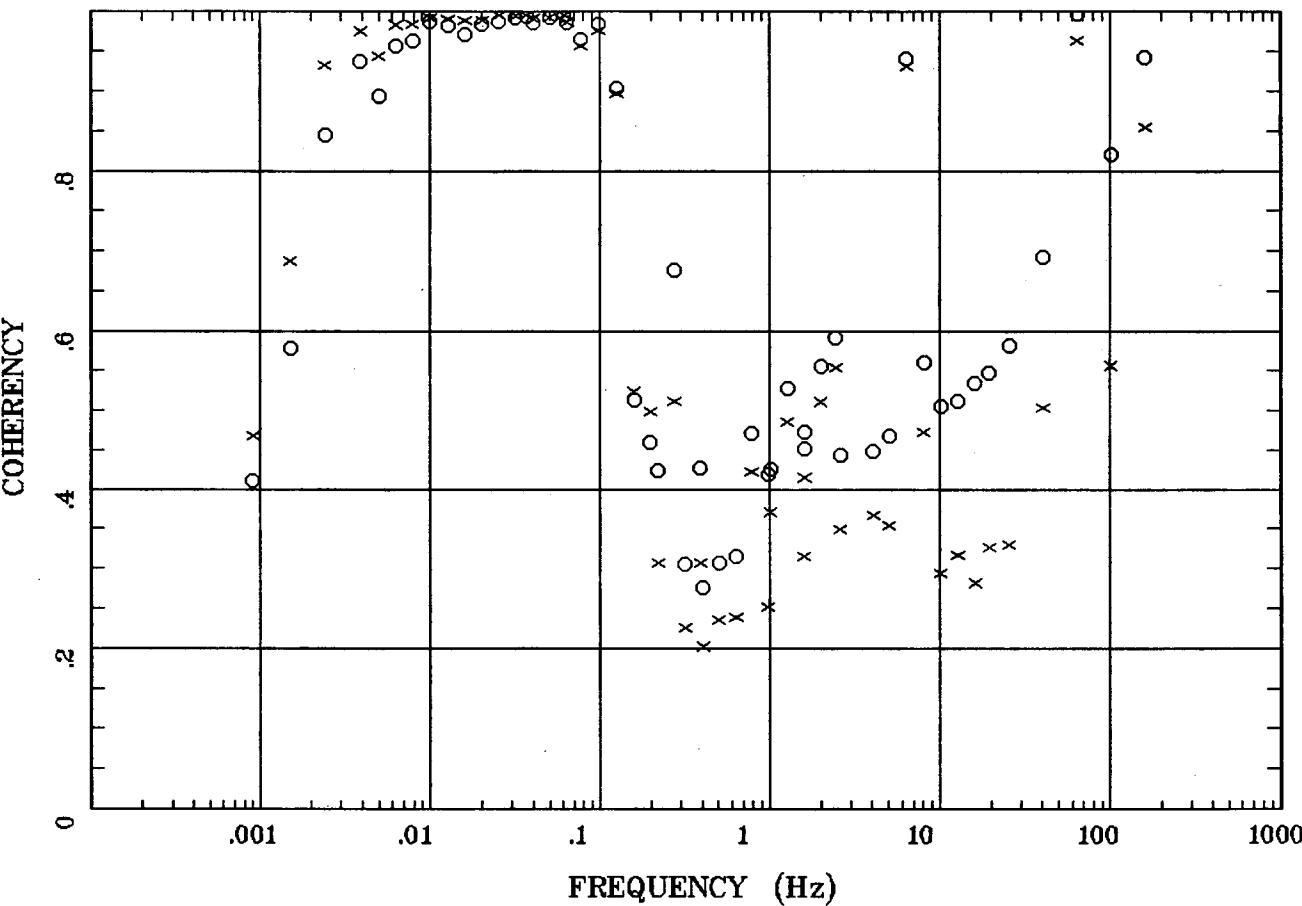
## IMPEDANCE SKEW



Client:  
Remote:  
Acquired: 19:5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s51r15.a02  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 13:18 Dec 08, 2004  
< EMI - ElectroMagnetic Instruments >

## E MULT Coh.



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

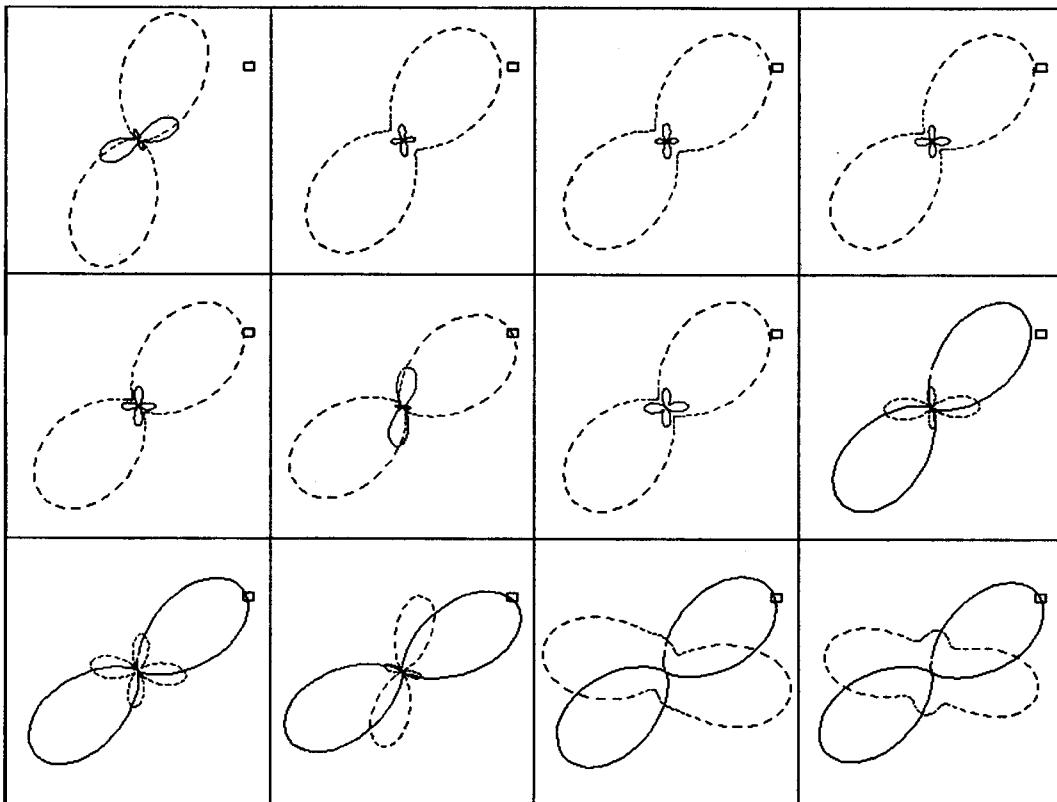
Filename: s51r15.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:18 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## POLAR PLOTS



.0009 Hz

.0635 Hz

1.587 Hz

.0050 Hz

.159 Hz

4.059 Hz

.0127 Hz

.391 Hz

10.132 Hz

.0366 Hz

.781 Hz

25.604 Hz

Rotation:

Filename: s51r15.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:18 Dec 08, 2004

< EMI - ElectroMagnetic Instruments >

Client:

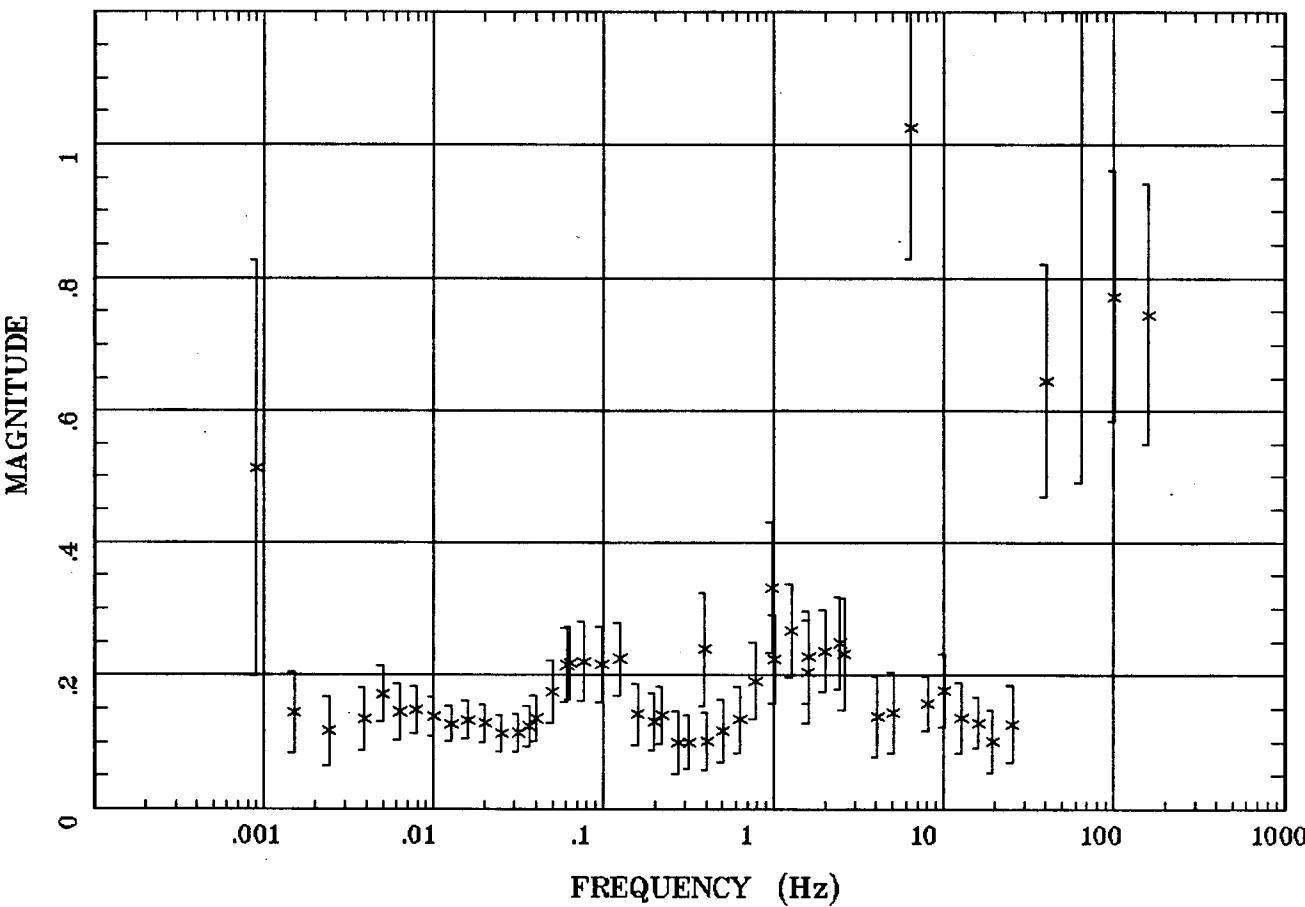
Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

## TIPPER MAGNITUDE

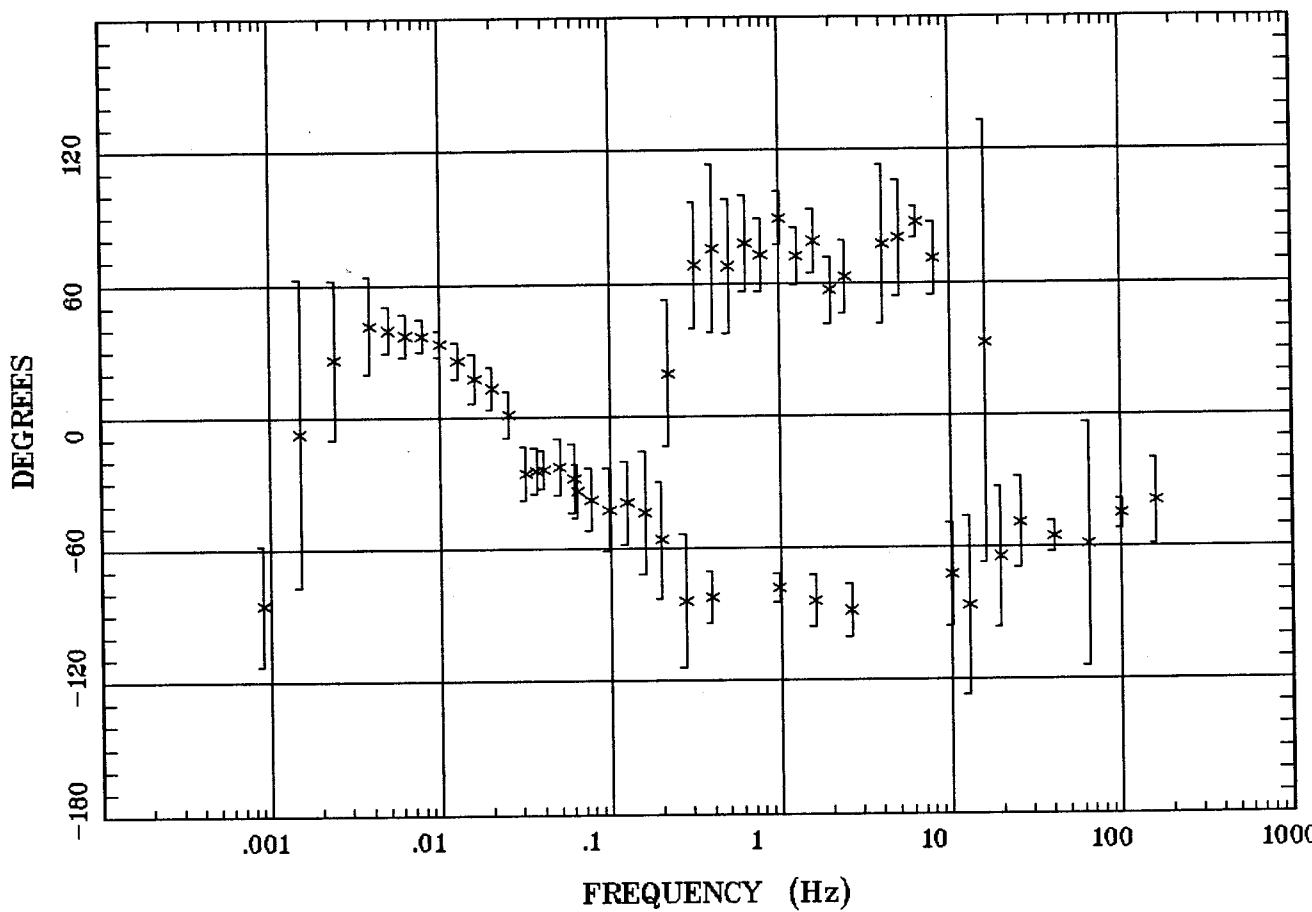
16



Client:  
Remote:  
Acquired: 19.5 Mar 08, 1998  
Survey Co:

Rotation:  
Filename: s51r15.a02  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 13:18 Dec 08, 2004  
< EMI - ElectroMagnetic Instruments >

## TIPPER STRIKE



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

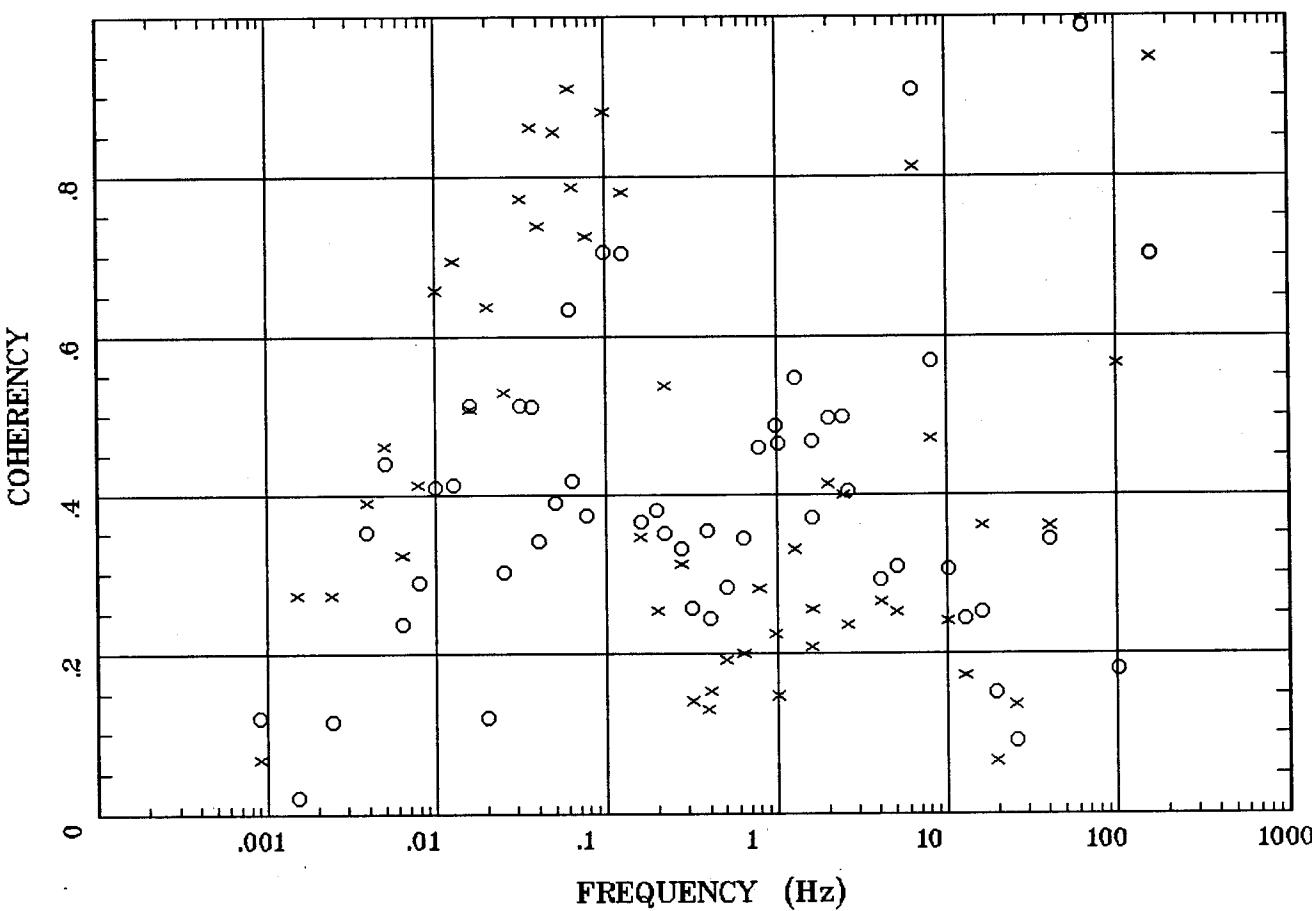
Filename: s51r15.a02

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:18 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

HzHx.x Coh HzHy.o



Client:

Remote:

Acquired: 19:5 Mar 08, 1998

Survey Co:

Rotation:

Filename: s51r15.a02

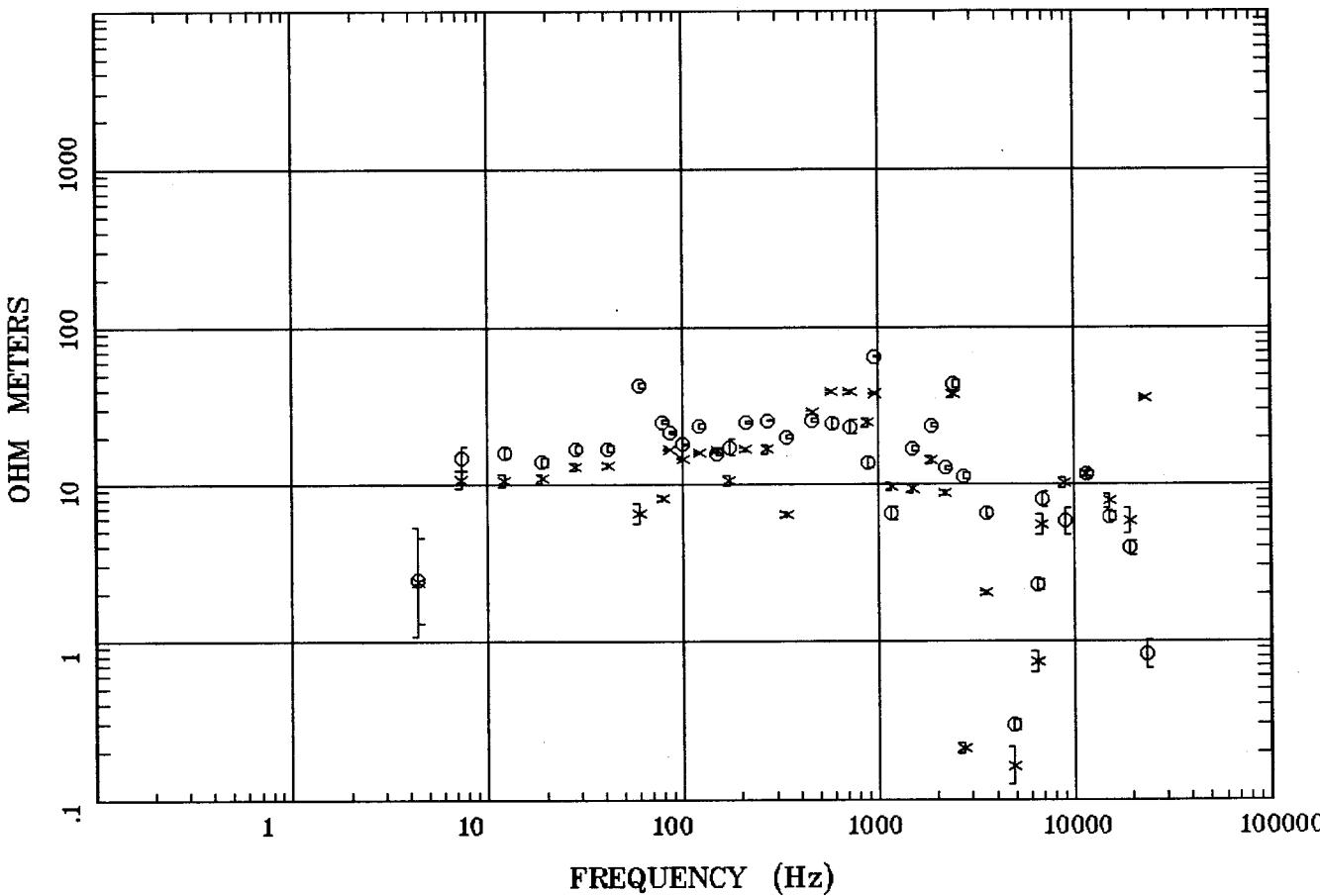
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 13:18 Dec 08, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## APPARENT RESISTIVITY

Priority 3

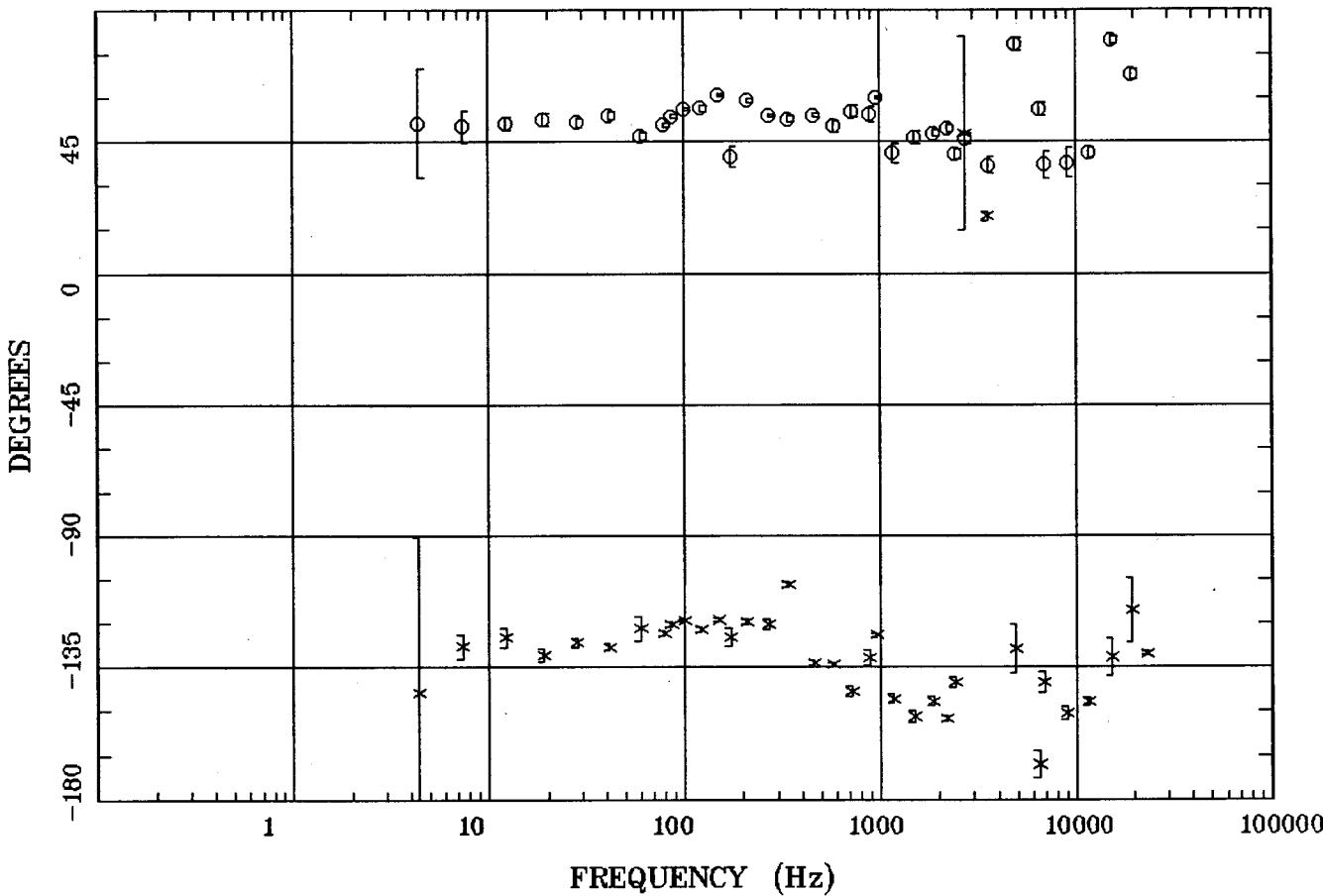


Client: Water Resources  
Remote: none  
Acquired: 12:0 Oct 31, 2003  
Survey Co:USGS

Rotation:  
Filename: nts43a.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 11:09 Dec 09, 2004  
< EMI - ElectroMagnetic Instruments >

## IMPEDANCE PHASE

Priority 3



Client: Water Resources

Remote: none

Acquired: 12:0 Oct 31, 2003

Survey Co:USGS

Rotation:

Filename: nts43a.avg

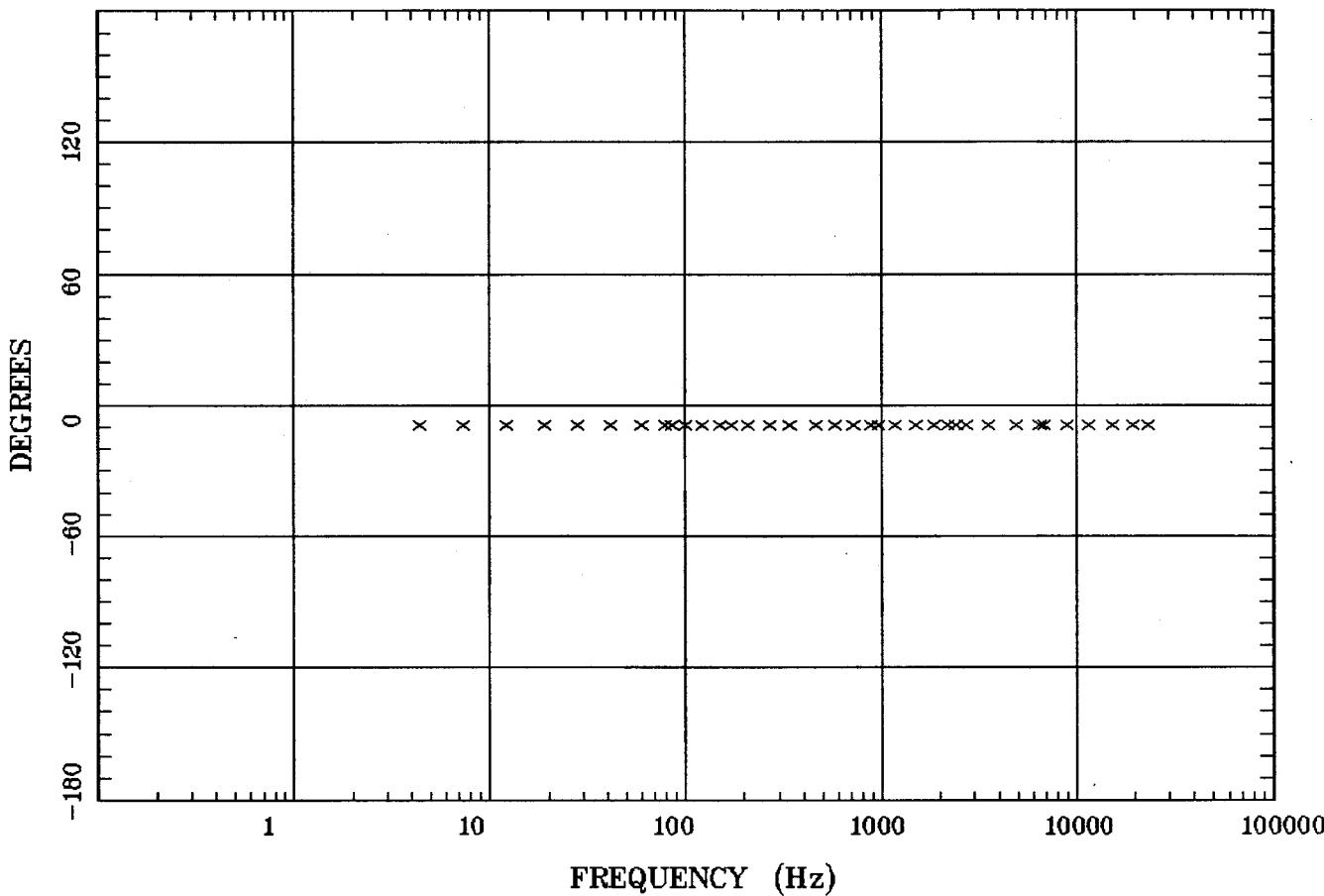
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:09 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

Priority 3

ROTATION ANGLE

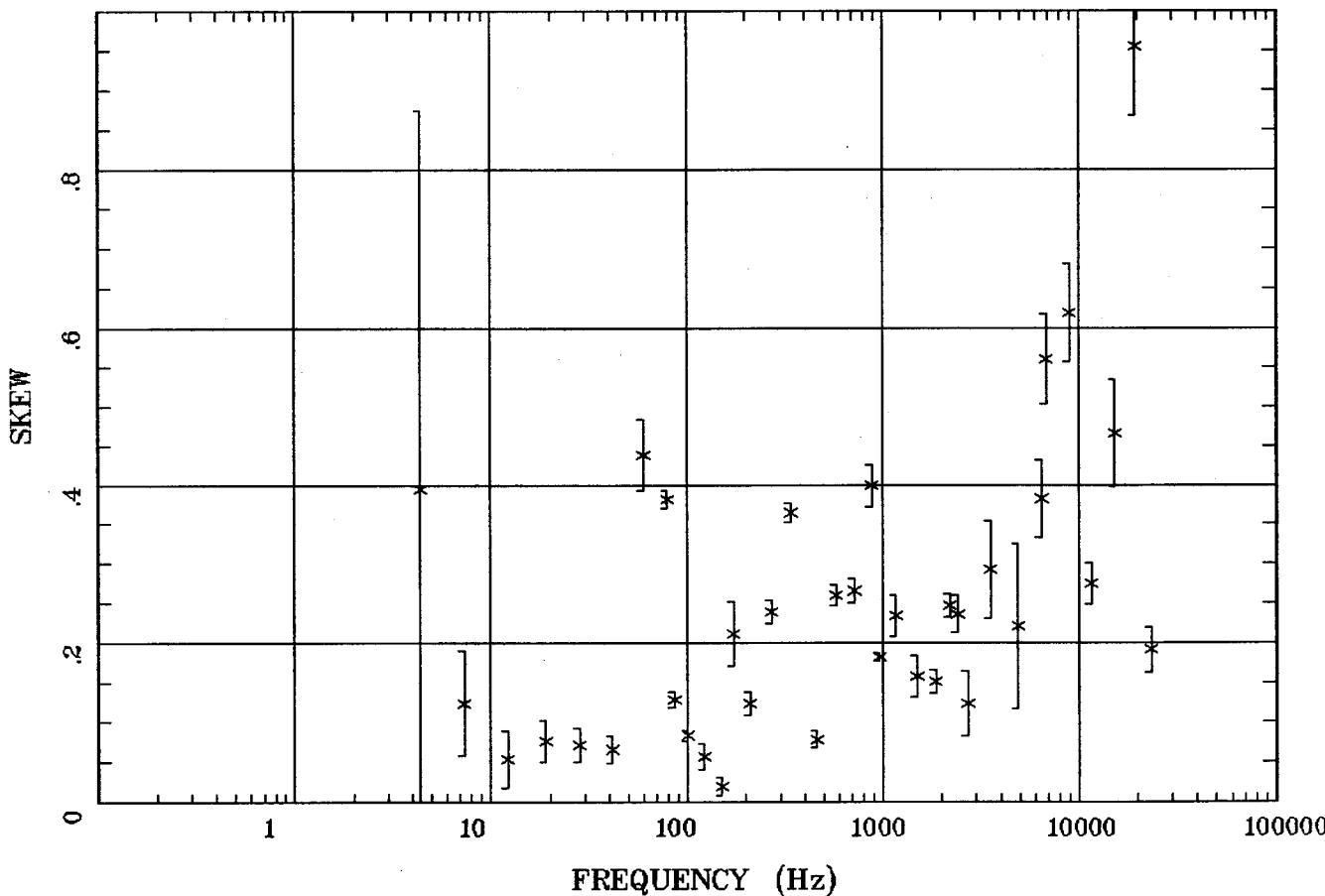


Client: Water Resources  
Remote: none  
Acquired: 12:0 Oct 31, 2003  
Survey Co:USGS

Rotation:  
Filename: nts43a.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 11:09 Dec 09, 2004  
< EMI - ElectroMagnetic Instruments >

## IMPEDANCE SKEW

Priority 3



Client: Water Resources

Remote: none

Acquired: 12:0 Oct 31, 2003

Survey Co:USGS

Rotation:

Filename: nts43a.avg

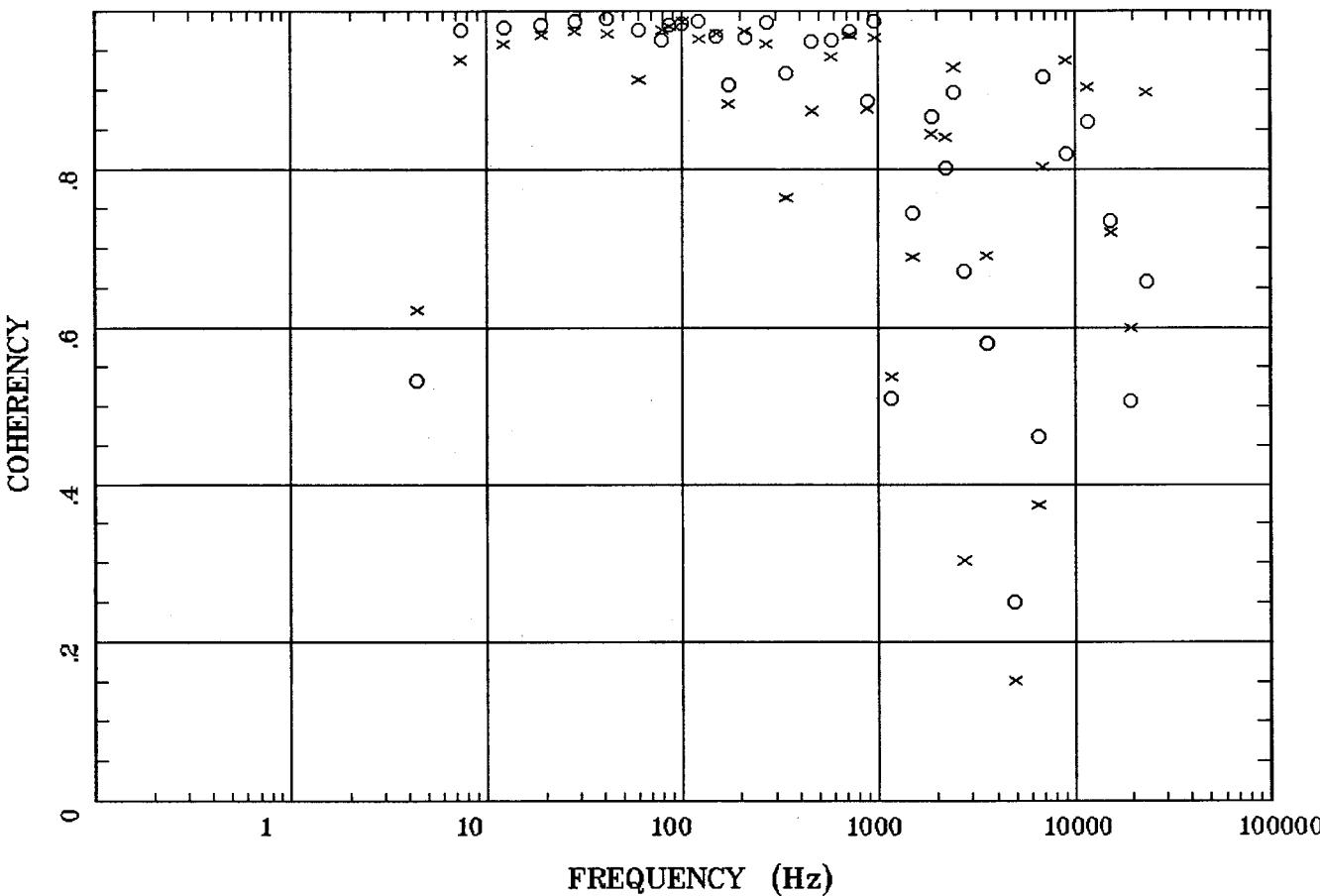
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:09 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

Priority 3

E MULT Coh.



Client: Water Resources

Remote: none

Acquired: 12:0 Oct 31, 2003

Survey Co:USGS

Rotation:

Filename: nts43a.avg

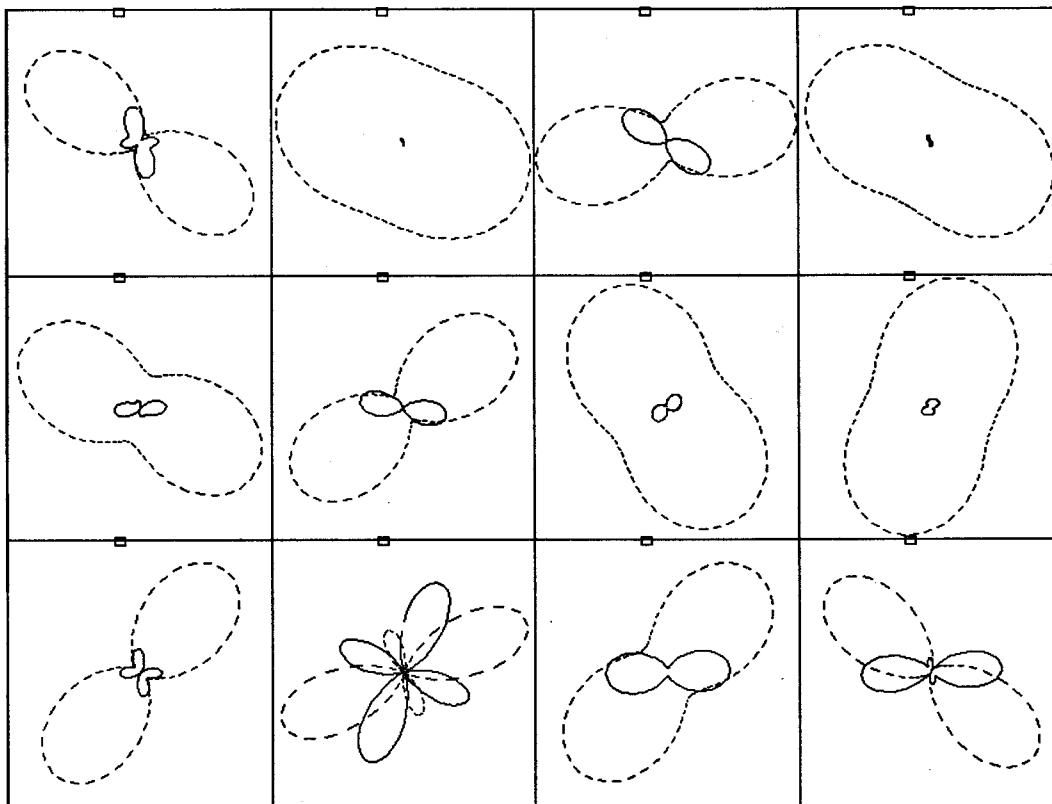
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:09 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## POLAR PLOTS

Priority 3



4.394 Hz

172 Hz  
2200 Hz

19.043 Hz

340 Hz  
3550 Hz

60.059 Hz

720 Hz  
6850 Hz

\*\*\*\*\* Hz

1170 Hz  
15290 Hz

Rotation:

Client: Water Resources

Remote: none

Ch1

Ch2

Ch3

Ch4

Ch5

Ch3

Ch4

Filename: nts43a.avg

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:09 Dec 09, 2004

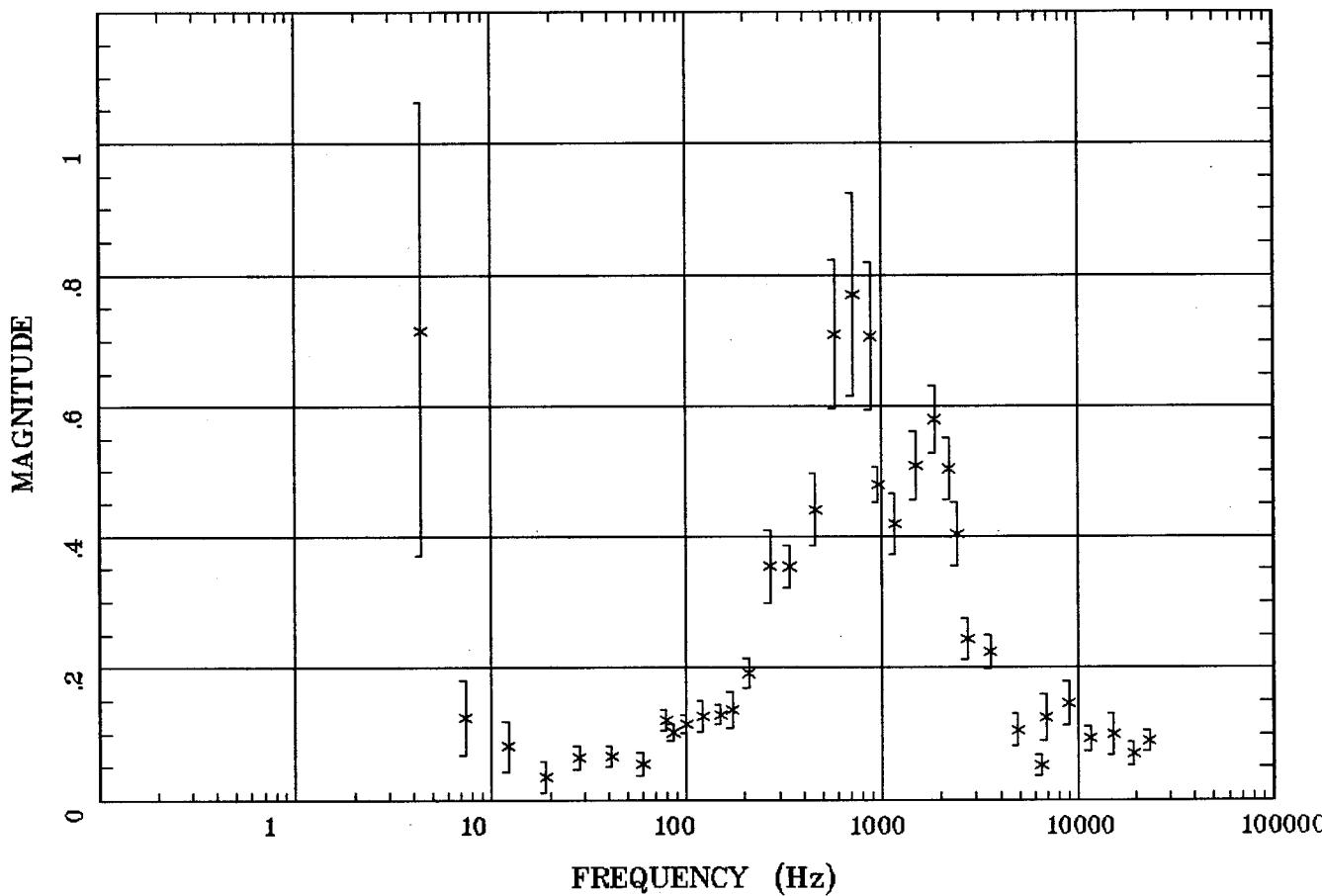
&lt; EMI - ElectroMagnetic Instruments &gt;

Acquired: 12:0 Oct 31, 2003

Survey Co:USGS

## TIPPER MAGNITUDE

Priority 3



Client: Water Resources

Remote: none

Acquired: 12:0 Oct 31, 2003

Survey Co:USGS

Rotation:

Filename: nts43a.avg

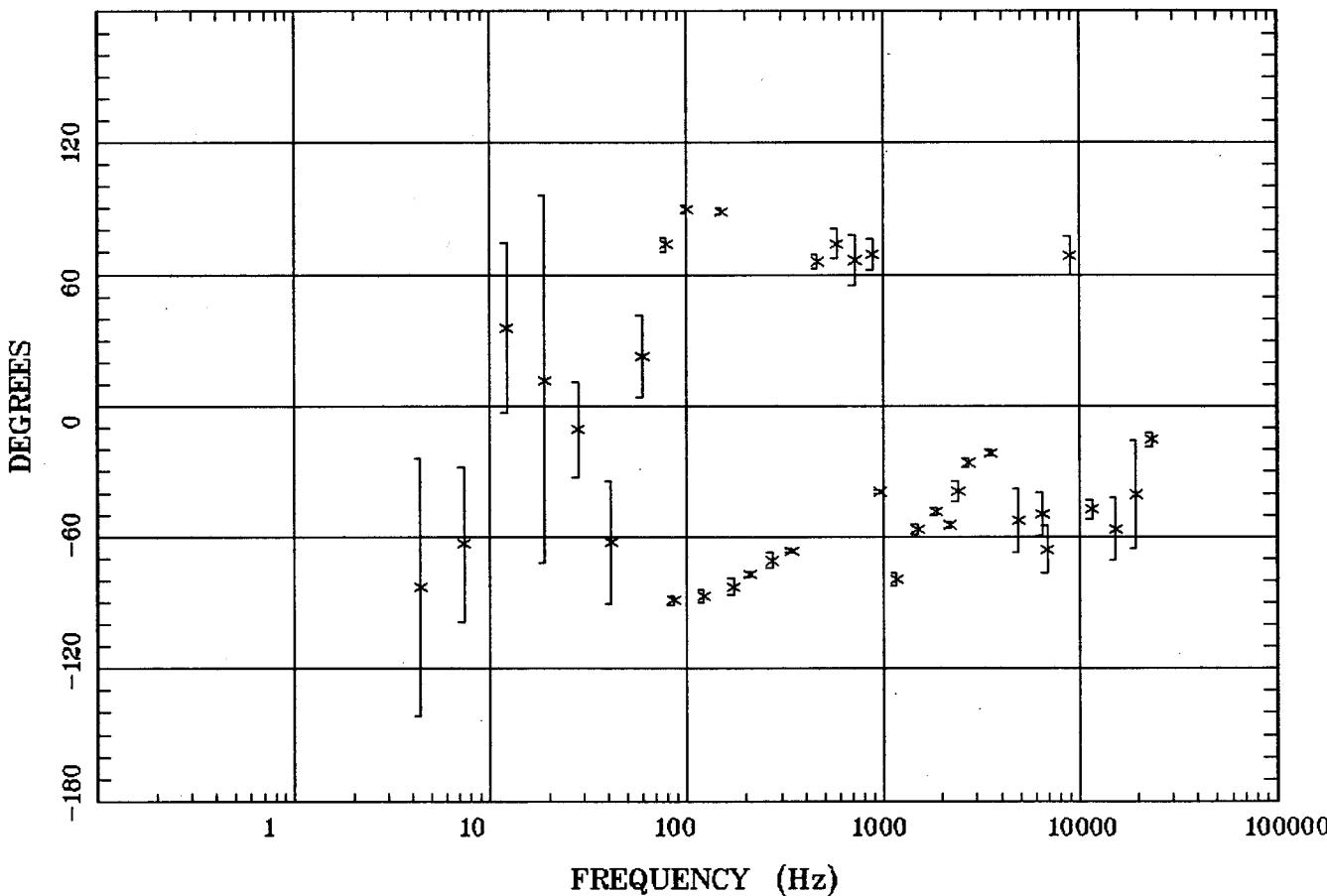
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:09 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## TIPPER STRIKE

## Priority 3



Client: Water Resources

Remote: none

Acquired: 12:0 Oct 31, 2003

Survey Co:USGS

Rotation:

Filename: nts43a.avg

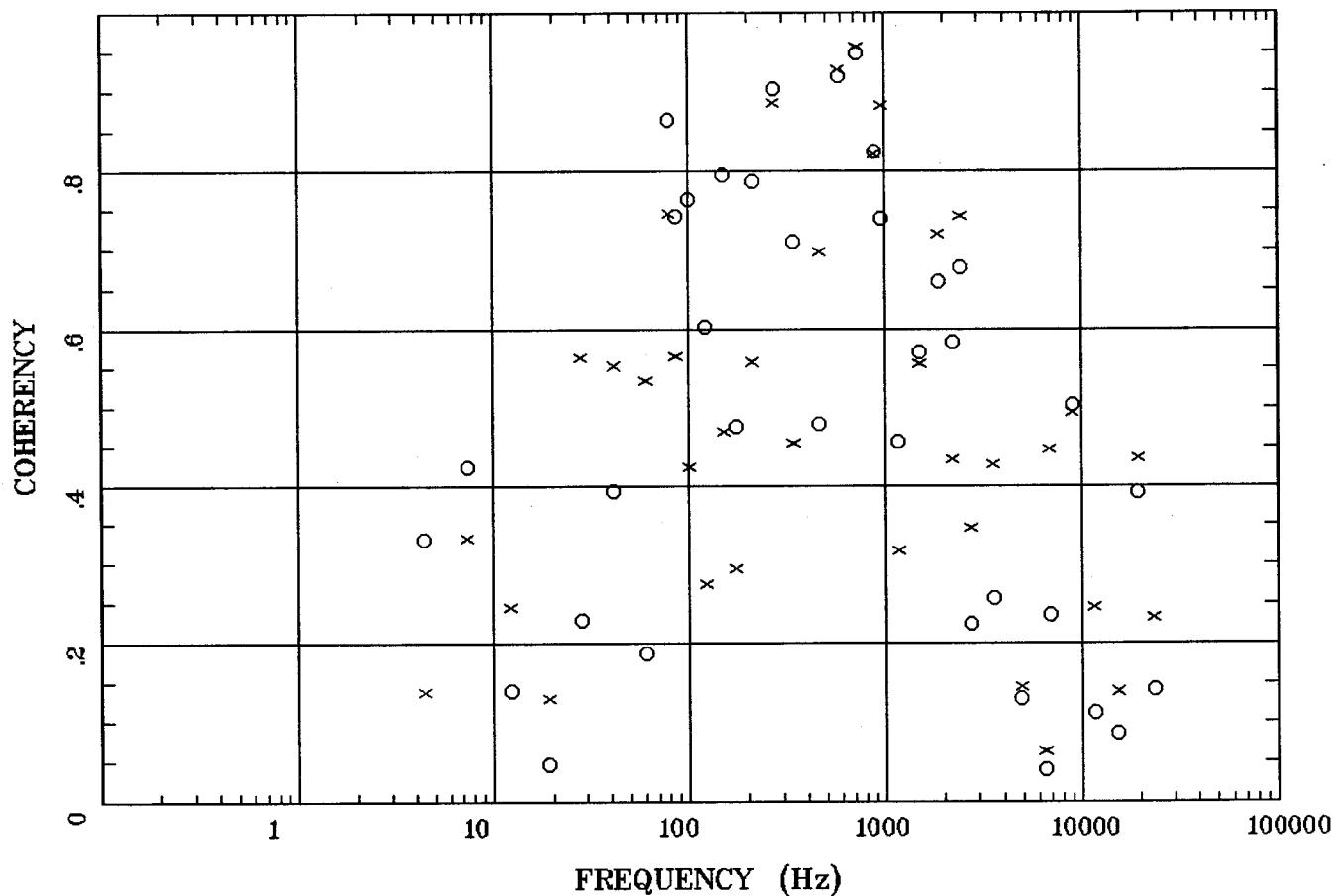
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:09 Dec 09, 2004

< EMI - ElectroMagnetic Instruments >

HzHx.x Coh HzHy.o

Priority 3



Client: Water Resources

Remote: none

Acquired: 12:0 Oct 31, 2003

Survey Co:USGS

Rotation:

Filename: nts43a.avg

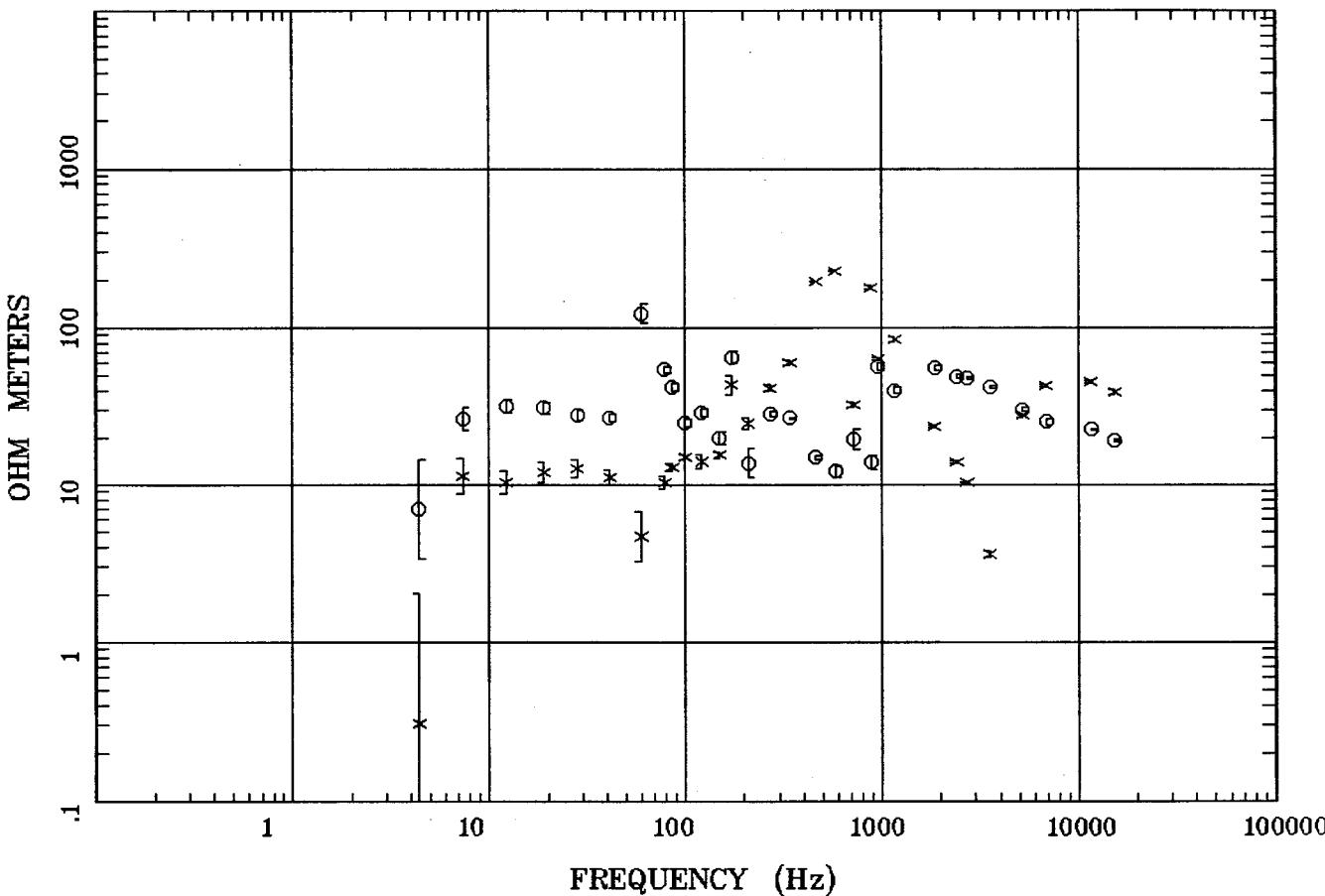
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:09 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## APPARENT RESISTIVITY

Priority 3

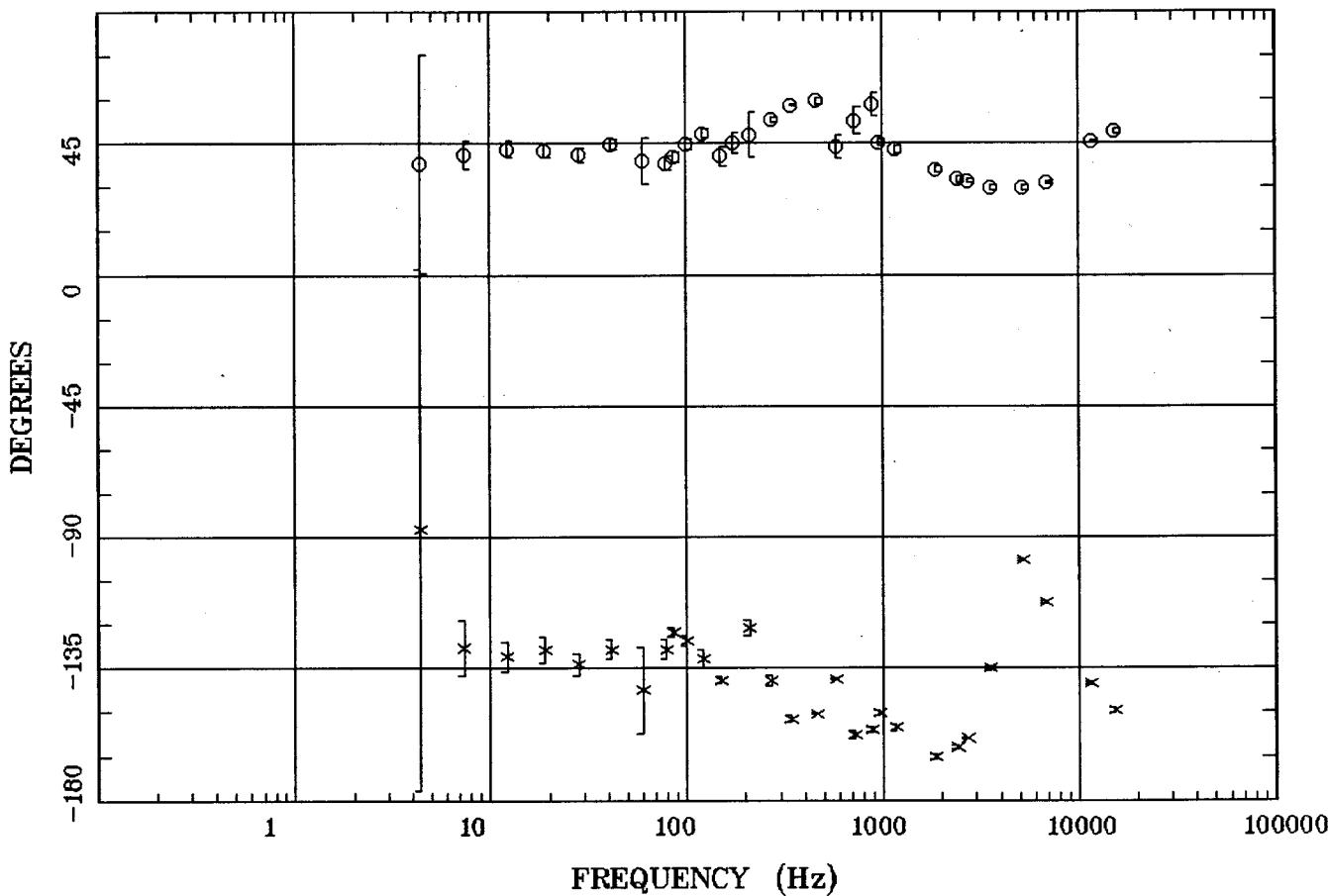


Client: Water Resources  
Remote: none  
Acquired: 12:0 Oct 29, 2003  
Survey Co:USGS

Rotation:  
Filename: nts44.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 11:10 Dec 09, 2004  
< EMI - ElectroMagnetic Instruments >

## IMPEDANCE PHASE

Priority 3



Client: Water Resources

Remote: none

Acquired: 12:0 Oct 29, 2003

Survey Co:USGS

Rotation:

Filename: nts44.avg

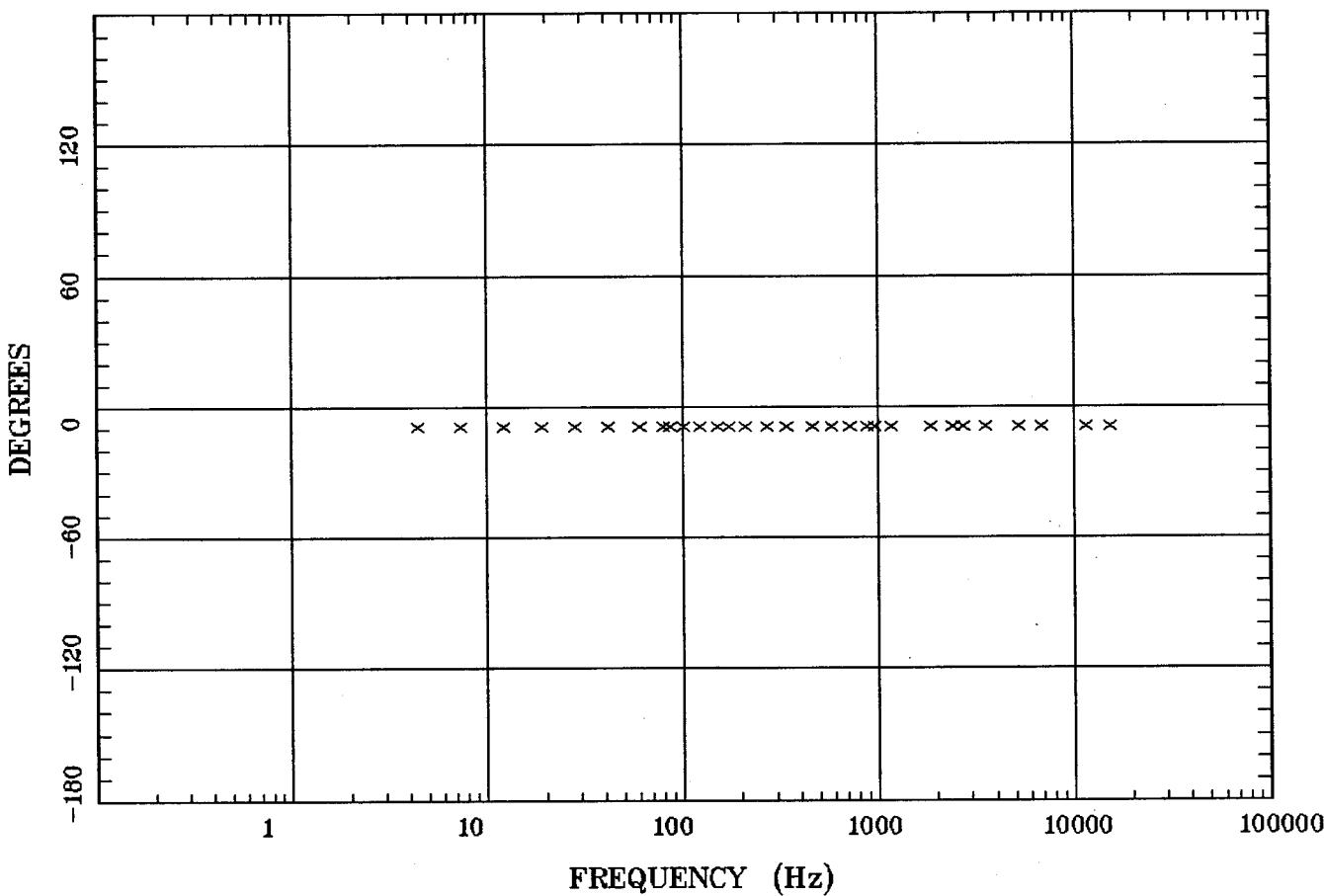
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:10 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## ROTATION ANGLE

Priority 3

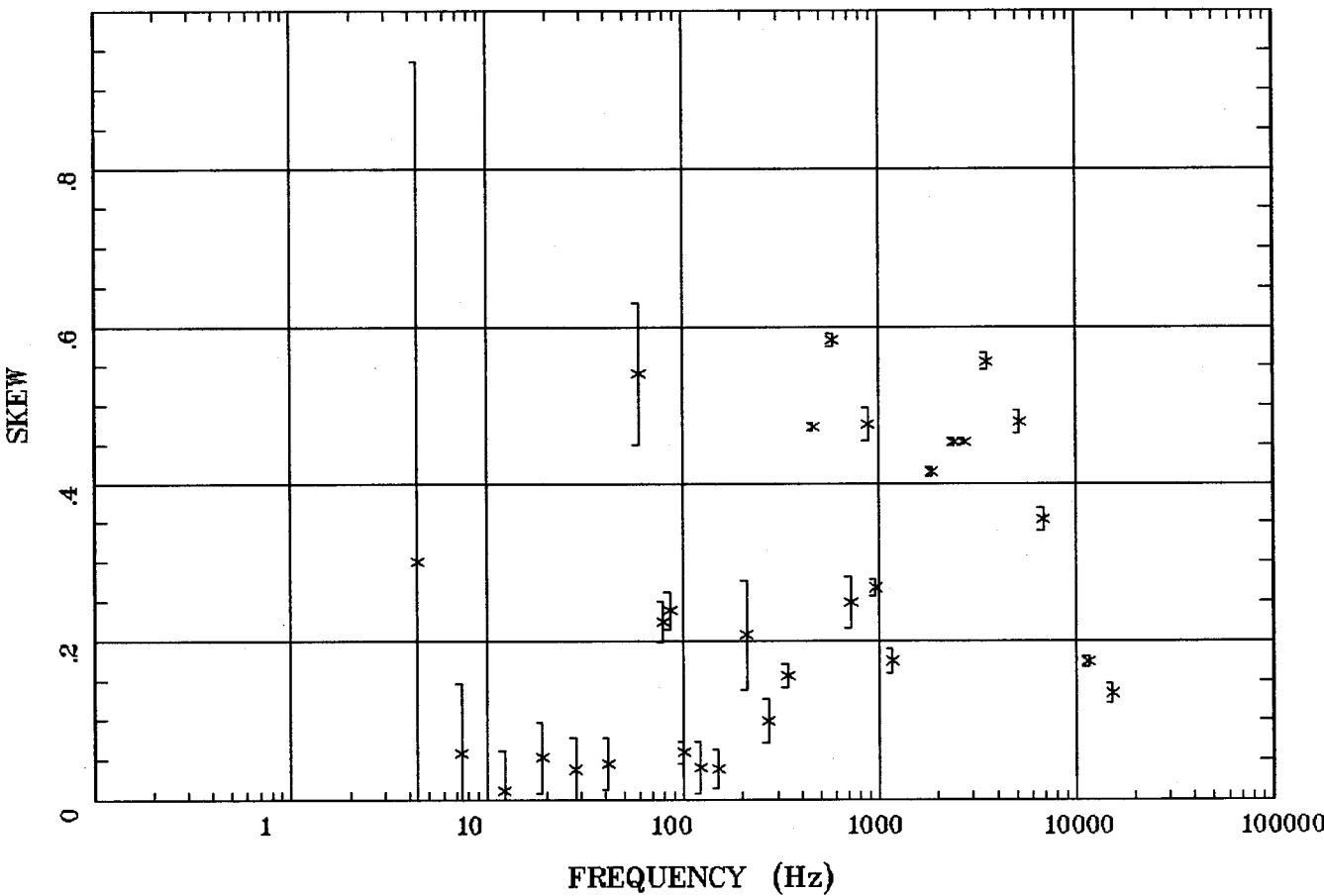


Client: Water Resources  
Remote: none  
Acquired: 12:0 Oct 29, 2003  
Survey Co:USGS

Rotation:  
Filename: nts44.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 11:10 Dec 09, 2004  
< EMI - ElectroMagnetic Instruments >

## IMPEDANCE SKEW

Priority 3



Client: Water Resources

Remote: none

Acquired: 12:0 Oct 29, 2003

Survey Co:USGS

Rotation:

Filename: nts44.avg

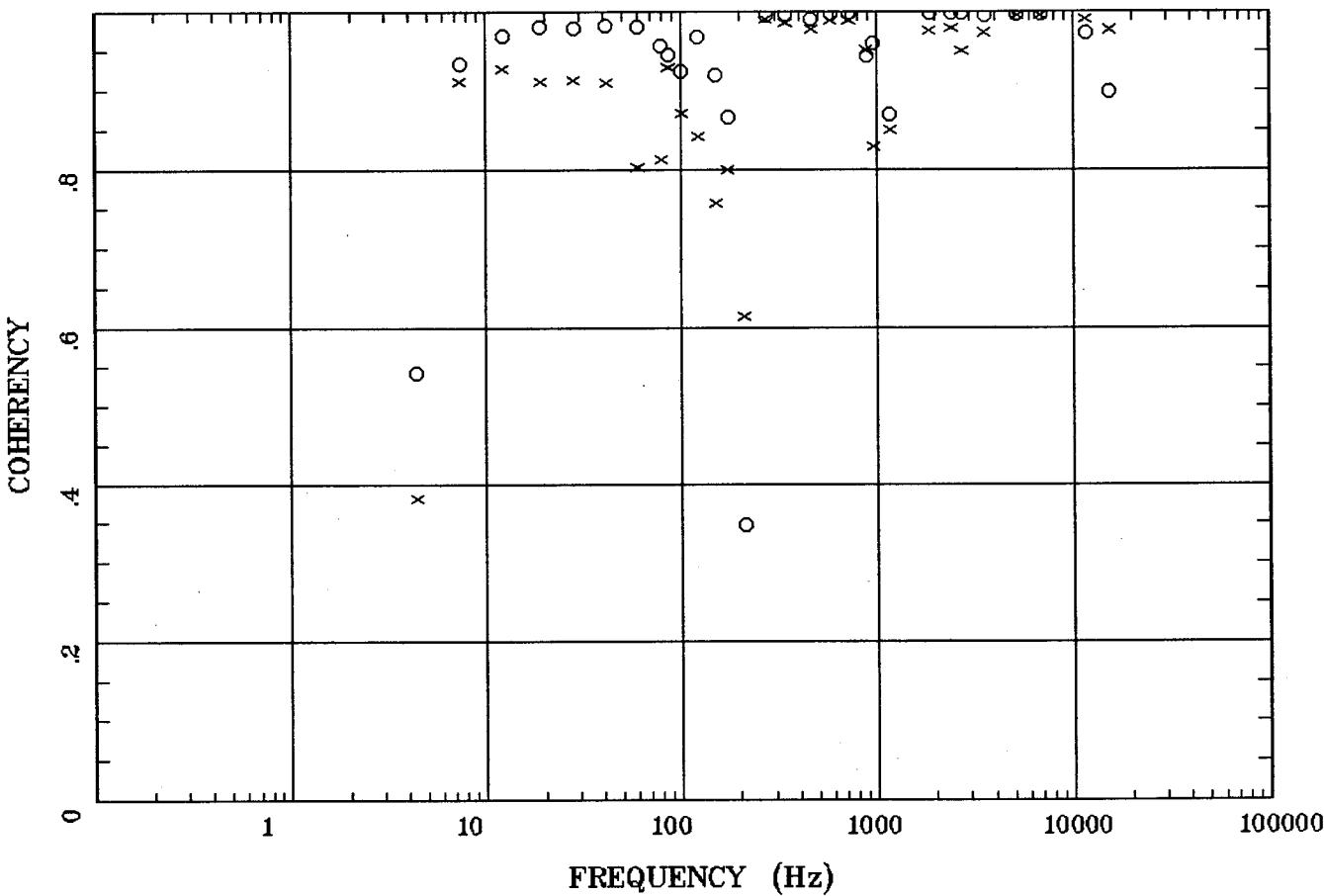
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:10 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## E MULT Coh.

### **Priority 3**



## Client: Water Resources

Remote: none

Acquired: 12:0 Oct. 29, 2003

Survey Co:USGS

**Rotation:**

Filename: nts44.sv4

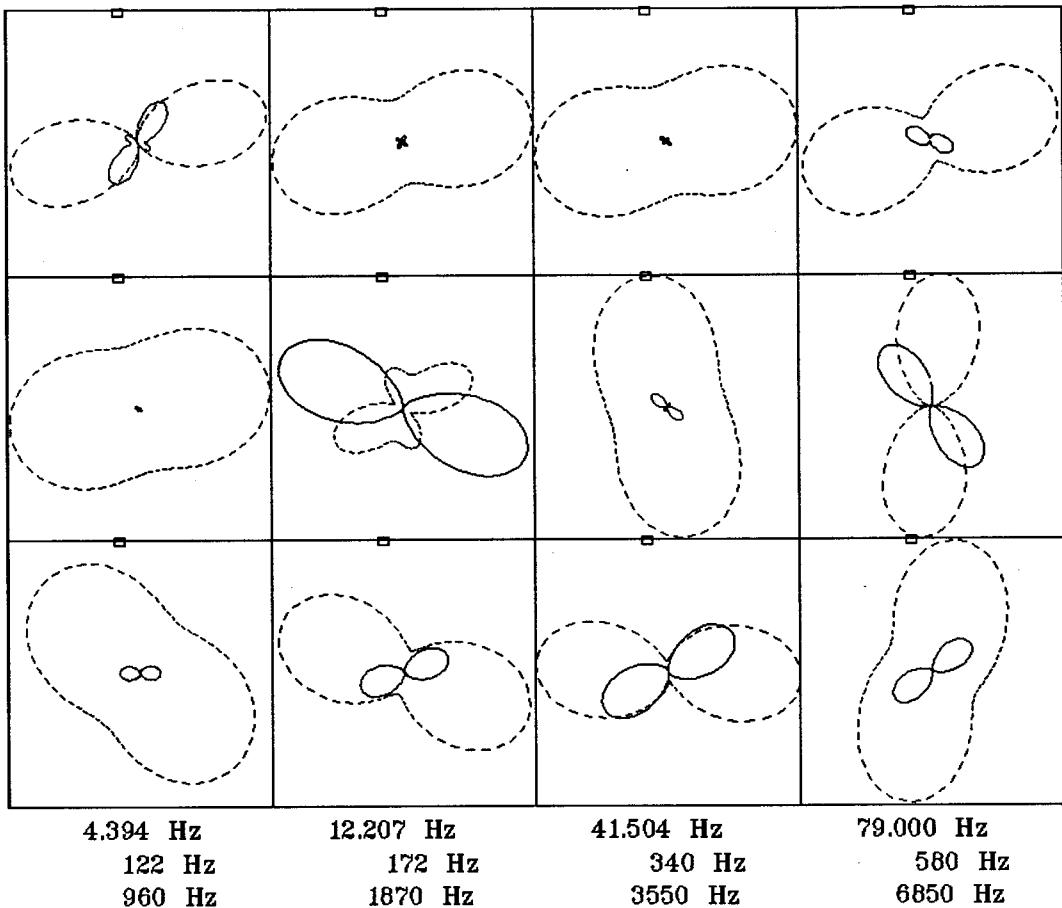
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:10 Dec 09 2004

< EMI = ElectroMagnetic Instruments >

## POLAR PLOTS

Priority 3



Client: Water Resources

Remote: none

Acquired: 12:0 Oct 29, 2003

Survey Co:USGS

Rotation:

Filename: nts44.avg

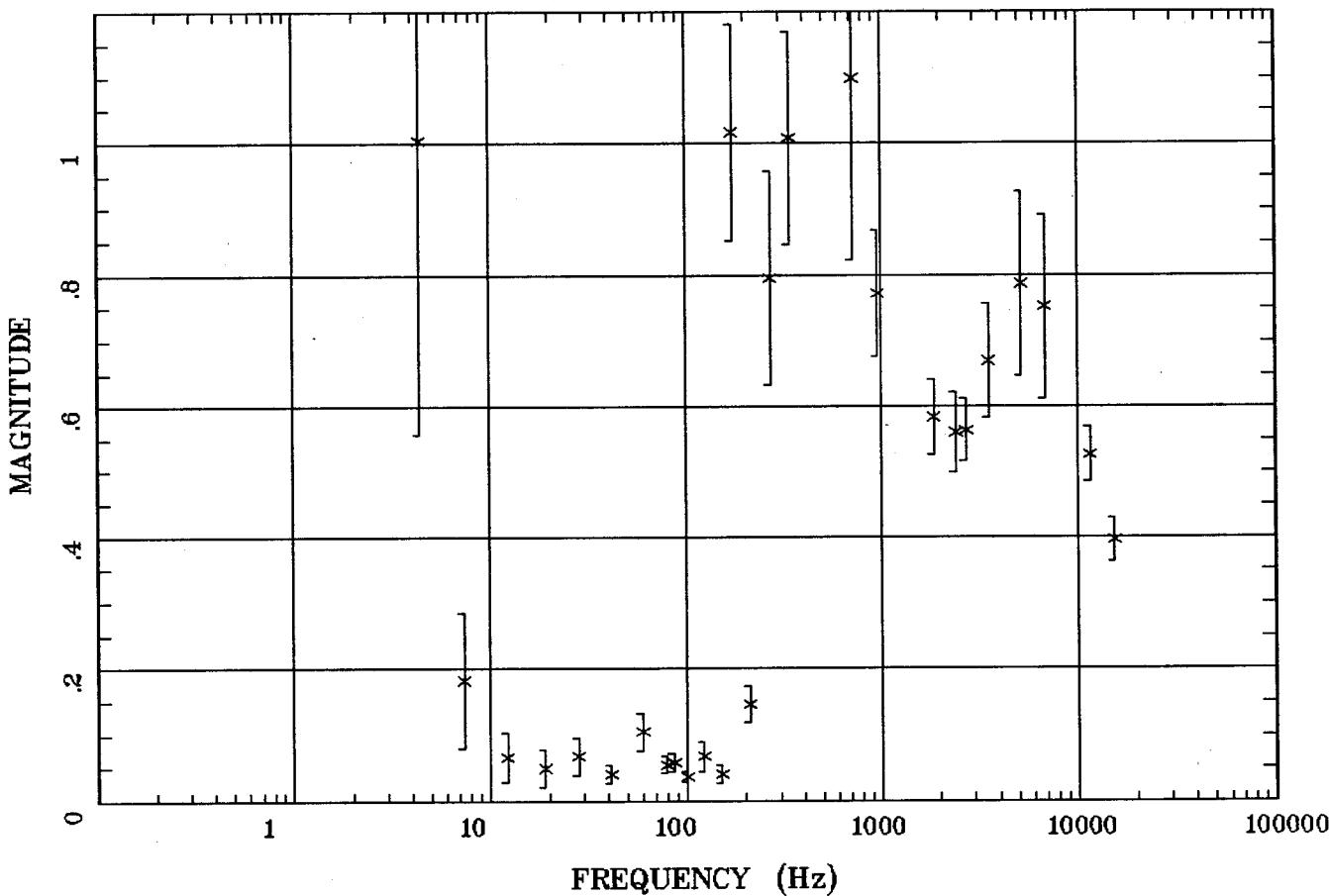
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:10 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## TIPPER MAGNITUDE

Priority 3



Client: Water Resources

Remote: none

Acquired: 12:0 Oct 29, 2003

Survey Co:USGS

Rotation:

Filename: nts44.avg

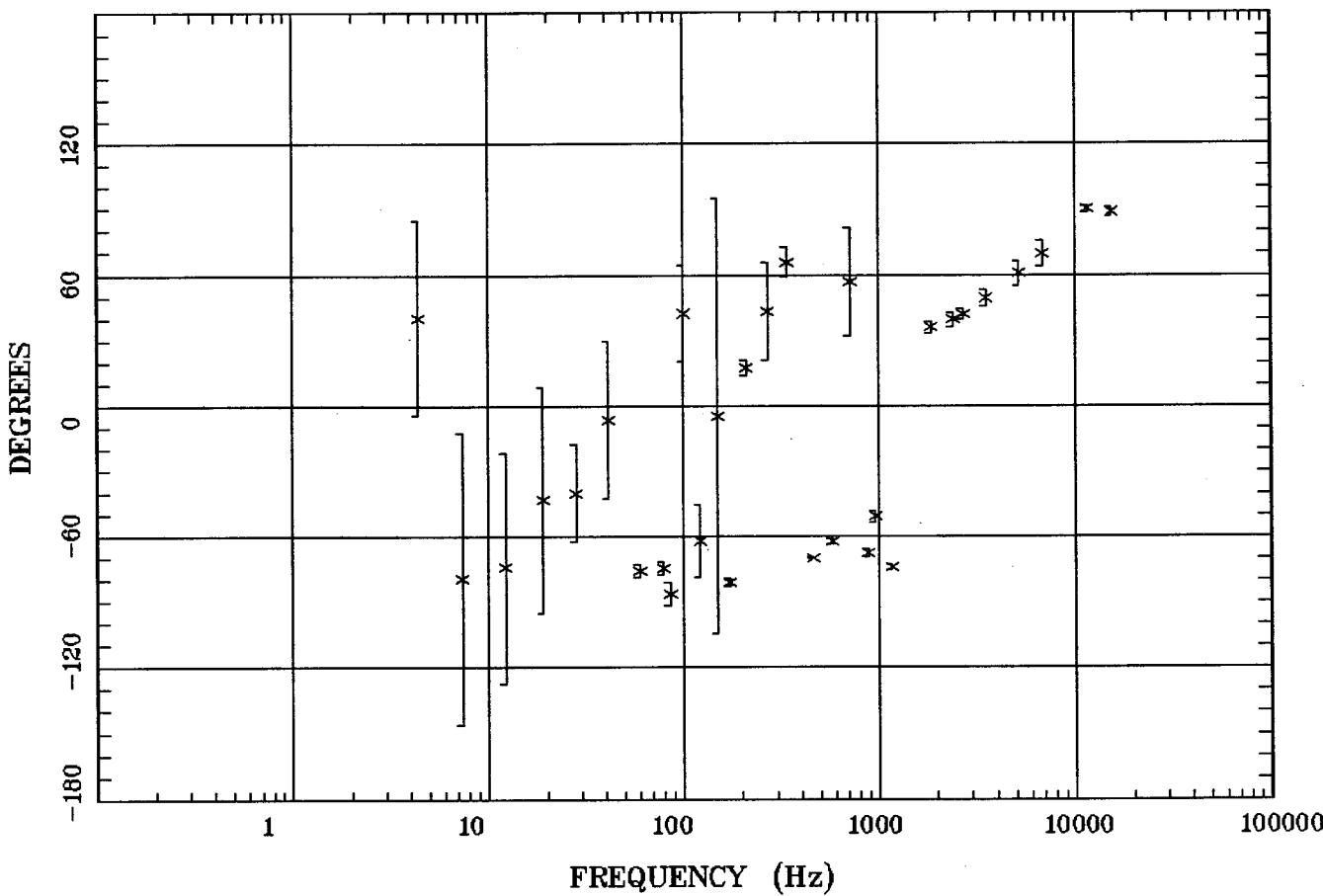
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:10 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

TIPPER STRIKE

Priority 3



Client: Water Resources

Remote: none

Acquired: 12:0 Oct 29, 2003

Survey Co:USGS

Rotation:

Filename: nts44.avg

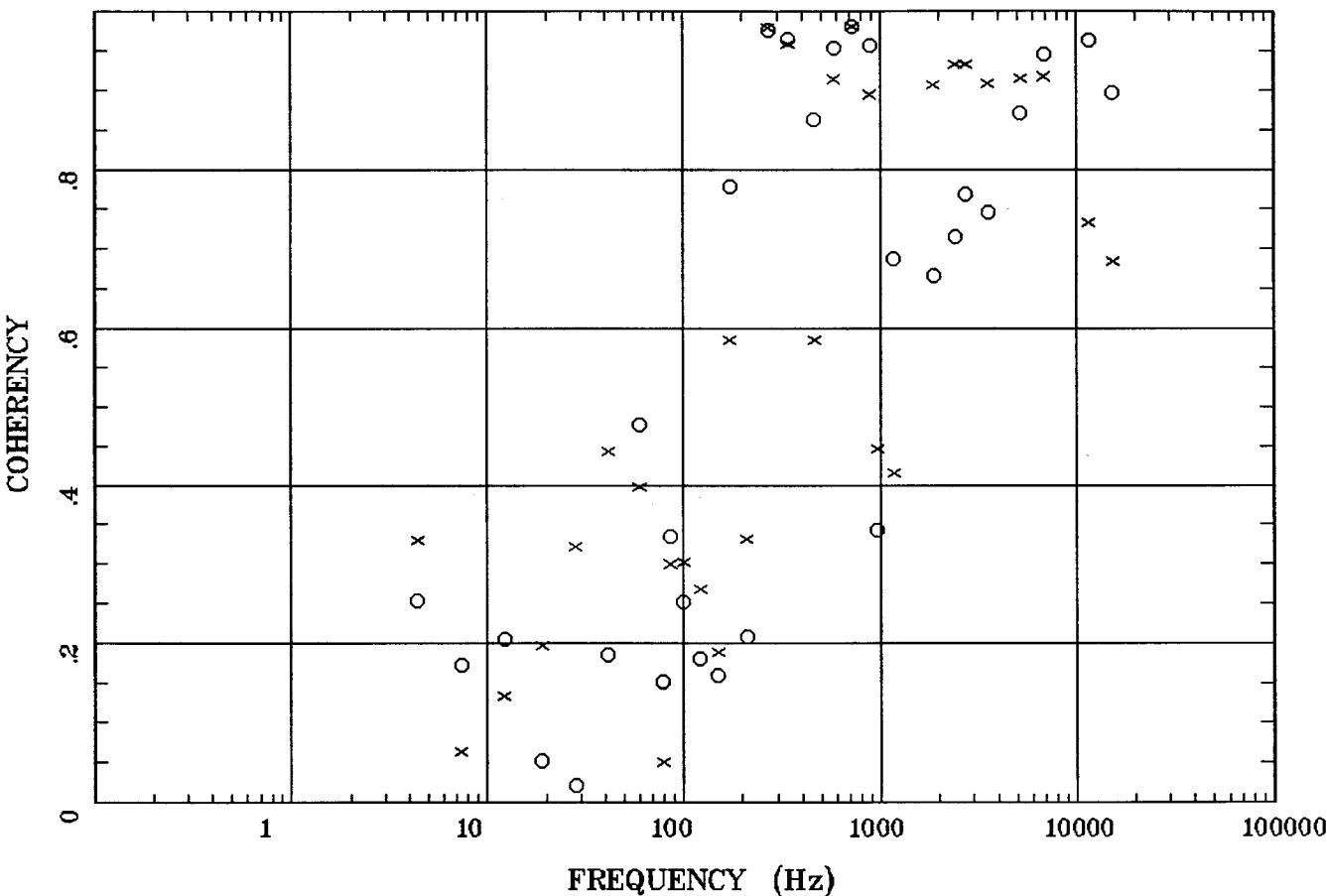
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:10 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

HzHxx Coh HzHy.o

Priority 3



Client: Water Resources

Remote: none

Acquired: 12:0 Oct 29, 2003

Survey Co:USGS

Rotation:

Filename: nts44.avg

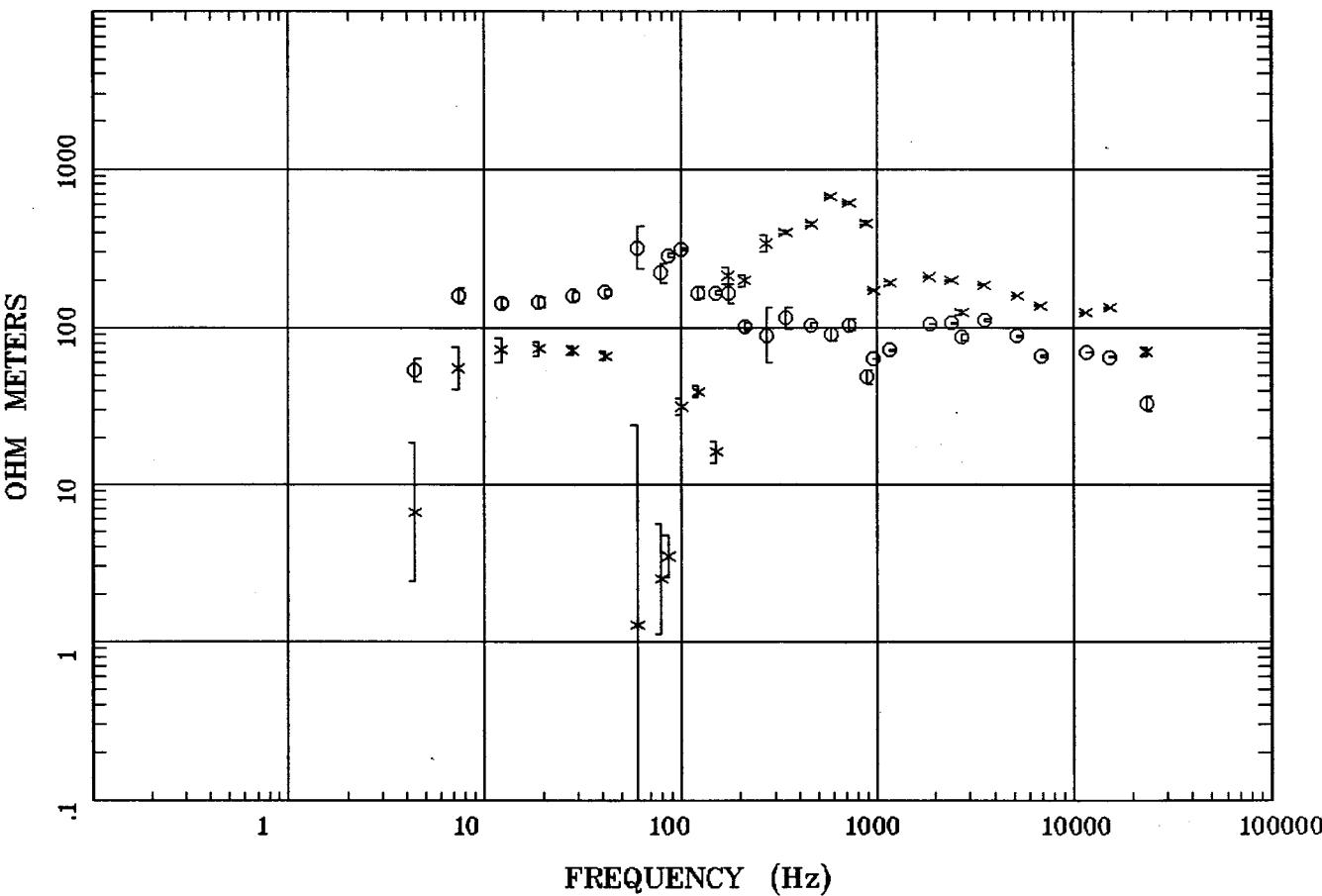
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:10 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## APPARENT RESISTIVITY

Priority 4



Client: Water Resources

Remote: none

Acquired: 14:0 Nov 03, 2003

Survey Co:USGS

Rotation:

Filename: nts45.avg

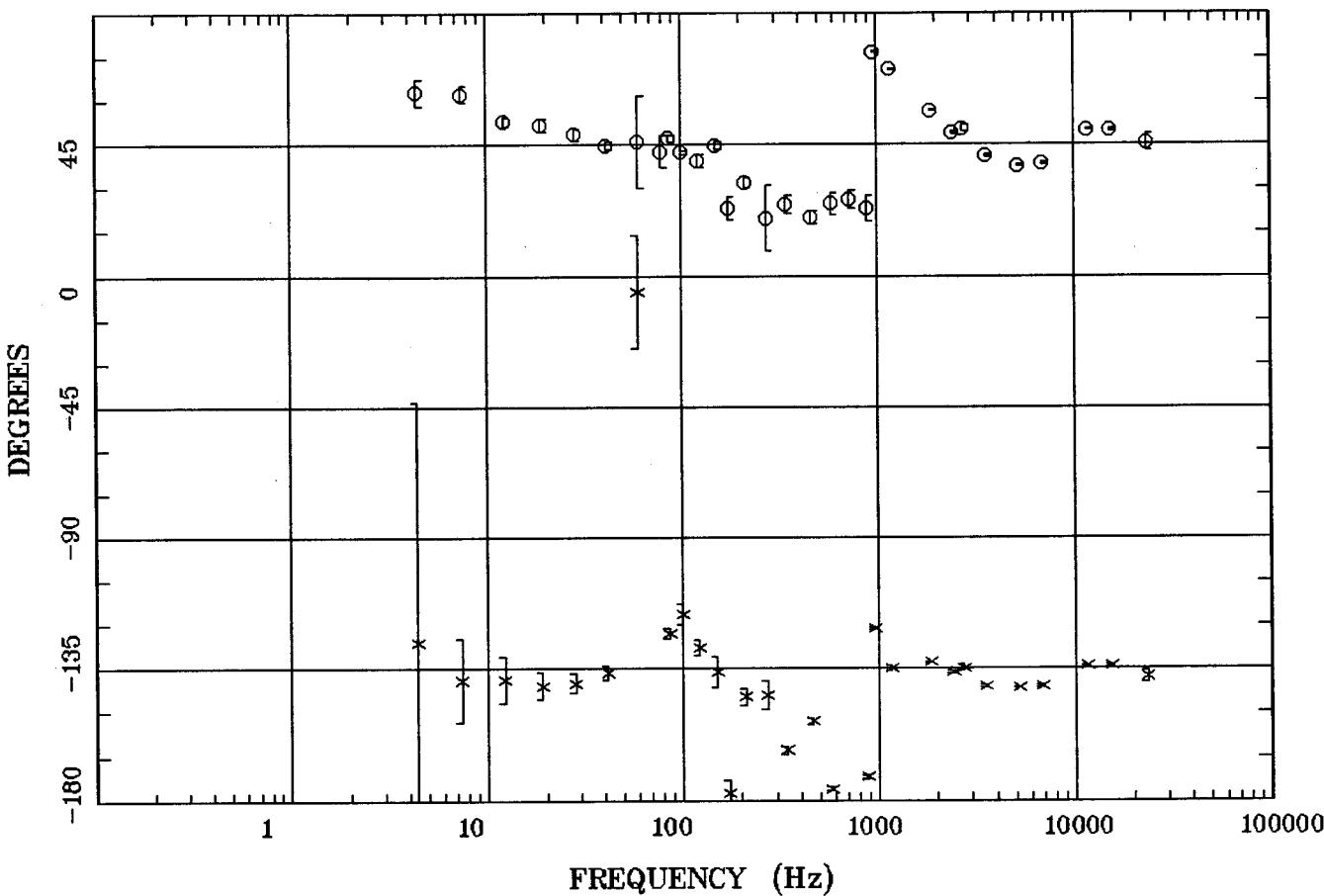
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:11 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## IMPEDANCE PHASE

Priority 4

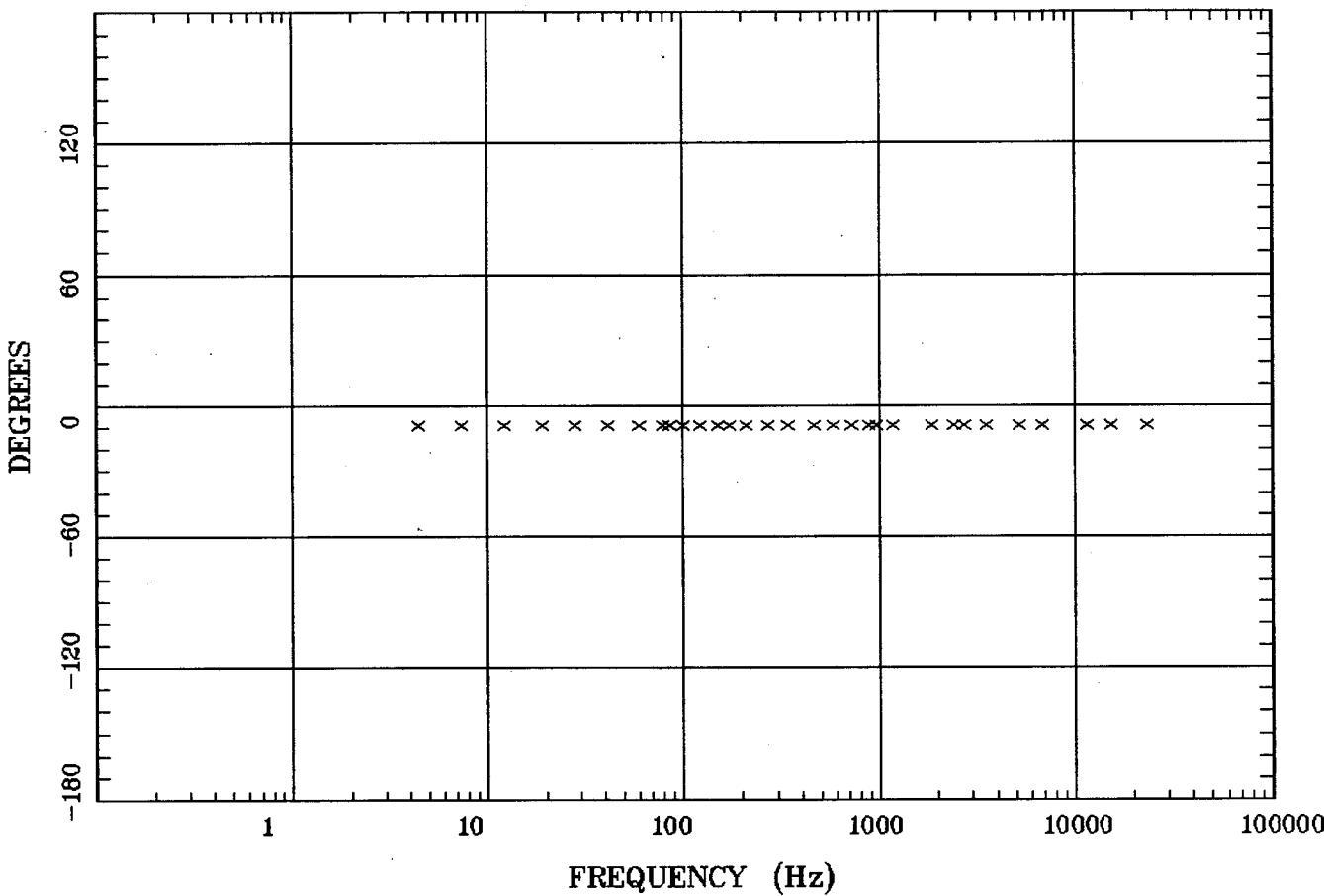


Client: Water Resources  
Remote: none  
Acquired: 14:0 Nov 03, 2003  
Survey Co:USGS

Rotation:  
Filename: nts45.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 11:11 Dec 09, 2004  
< EMI - ElectroMagnetic Instruments >

## ROTATION ANGLE

Priority 4

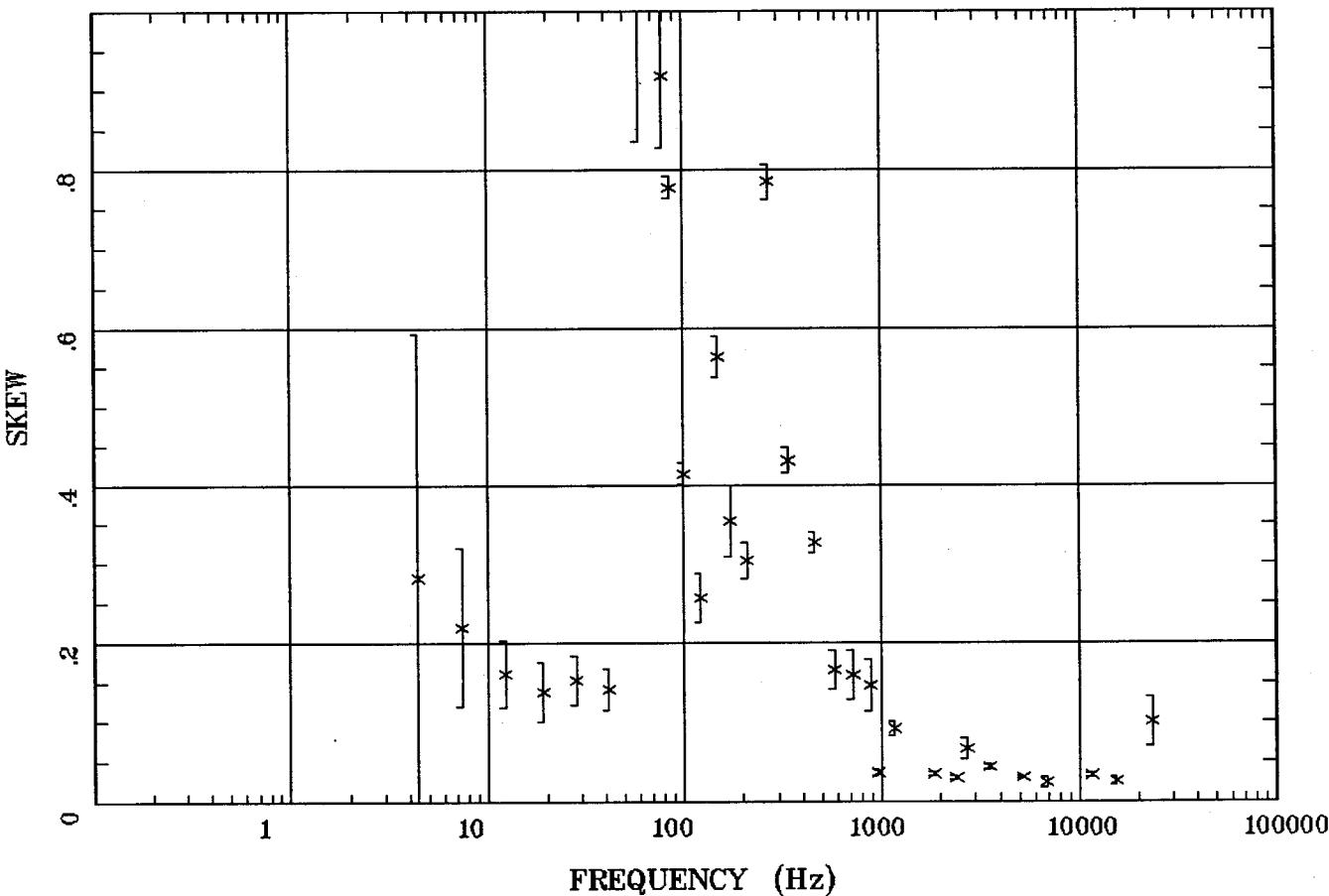


Client: Water Resources  
Remote: none  
Acquired: 14:0 Nov 03, 2003  
Survey Co:USGS

Rotation:  
Filename: nts45.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 11:11 Dec 09, 2004  
< EMI - ElectroMagnetic Instruments >

## IMPEDANCE SKEW

Priority 4



Client: Water Resources

Remote: none

Acquired: 14:0 Nov 03, 2003

Survey Co:USGS

Rotation:

Filename: nts45.avg

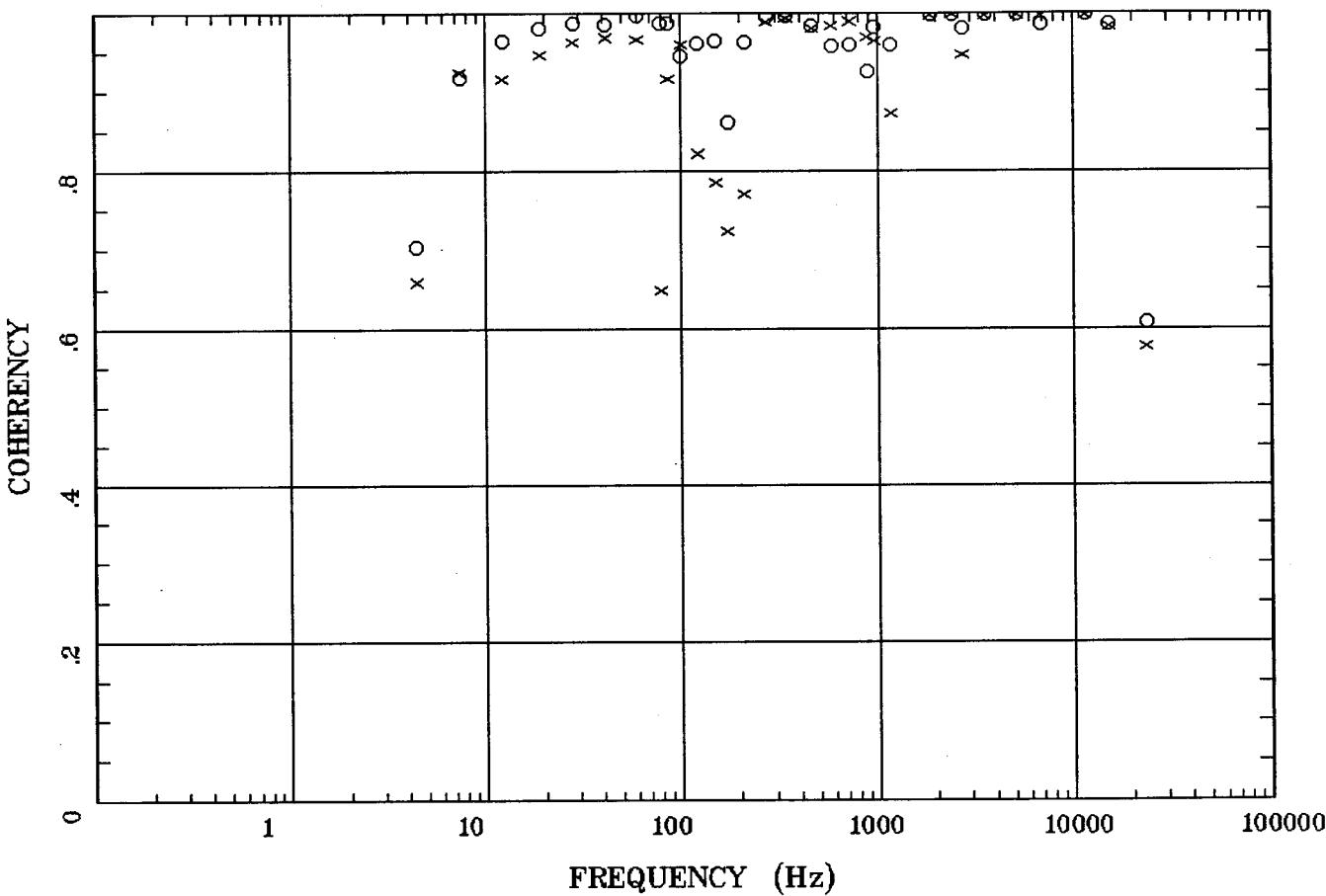
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:11 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

E MULT Coh.

Priority 4



Client: Water Resources

Remote: none

Acquired: 14:0 Nov 03, 2003

Survey Co:USGS

Rotation:

Filename: nts45.avg

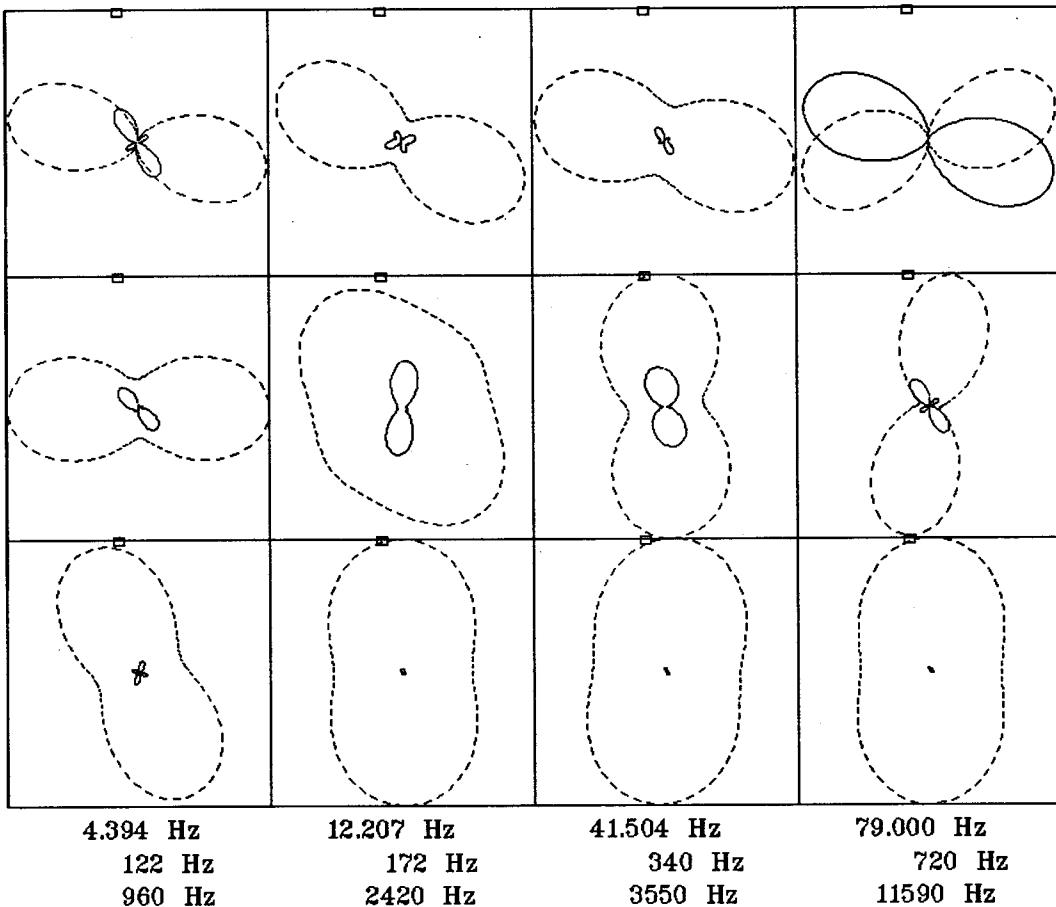
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:11 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## POLAR PLOTS

Priority 4



Client: Water Resources

Remote: none

Acquired: 14:0 Nov 03, 2003

Survey Co:USGS

Rotation:

Filename: nts45.avg

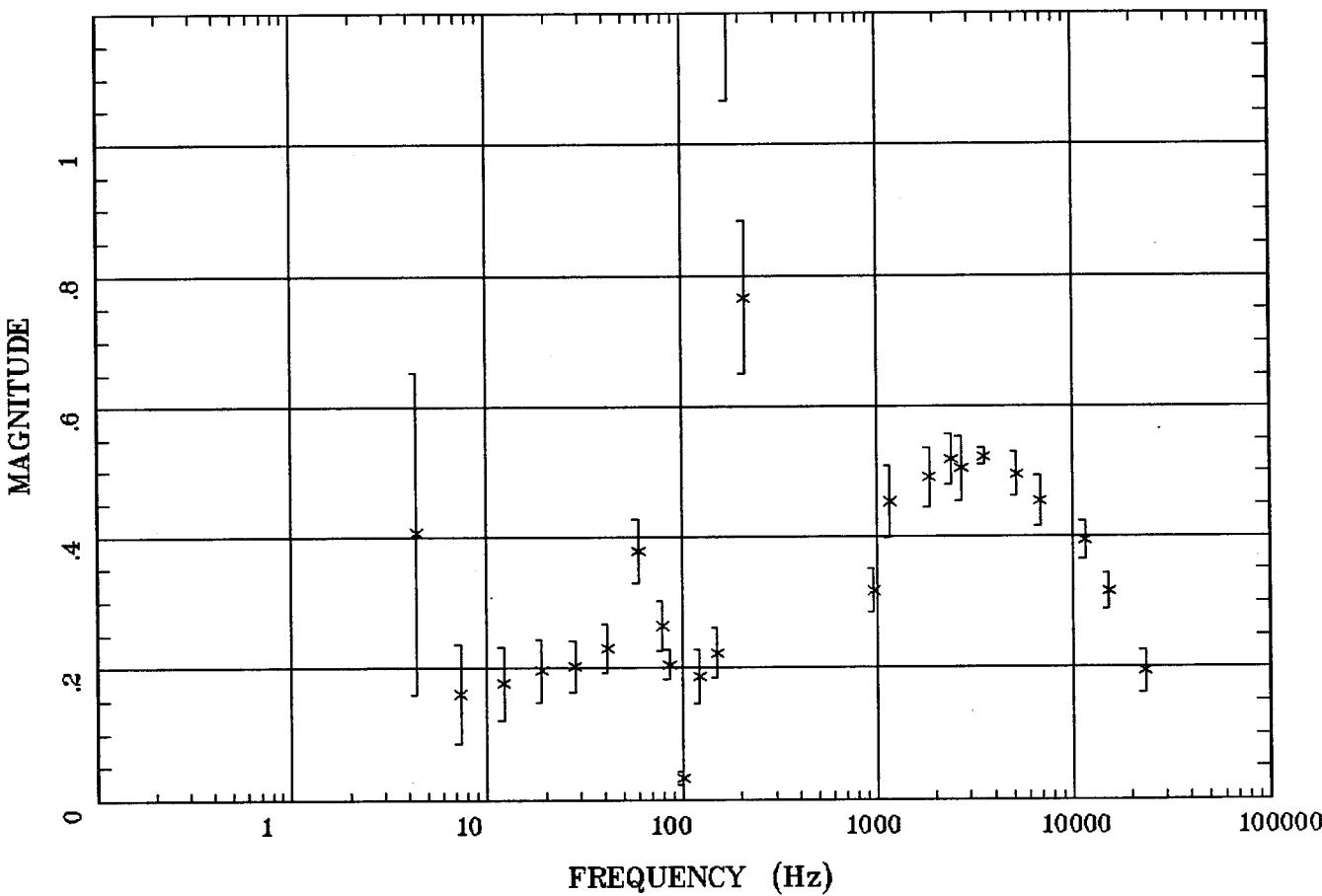
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:11 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## TIPPER MAGNITUDE

Priority 4



Client: Water Resources

Remote: none

Acquired: 14:0 Nov 03, 2003

Survey Co:USGS

Rotation:

Filename: nts45.avg

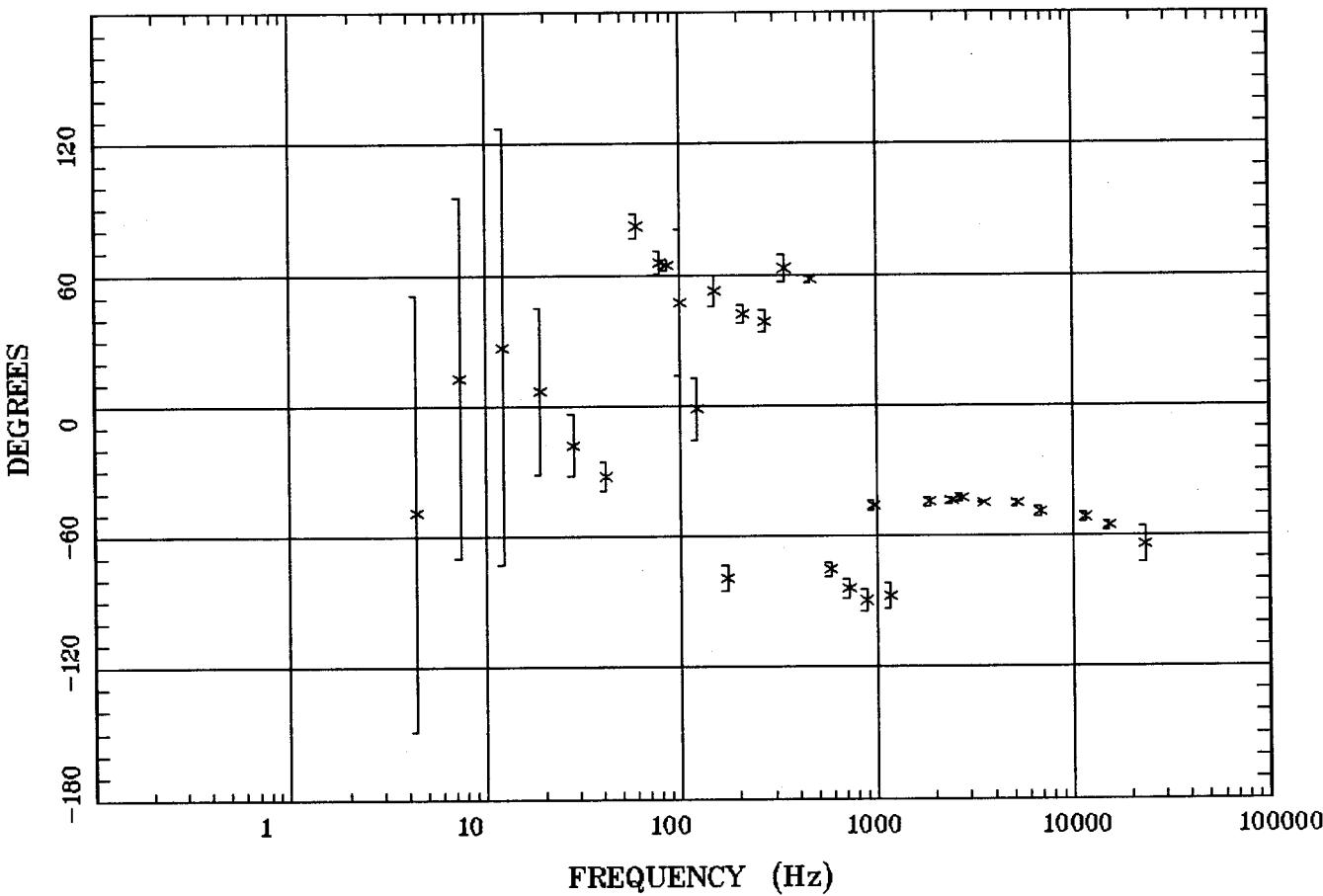
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:11 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

TIPPER STRIKE

Priority 4



Client: Water Resources

Remote: none

Acquired: 14:0 Nov 03, 2003

Survey Co:USGS

Rotation:

Filename: nts45.avg

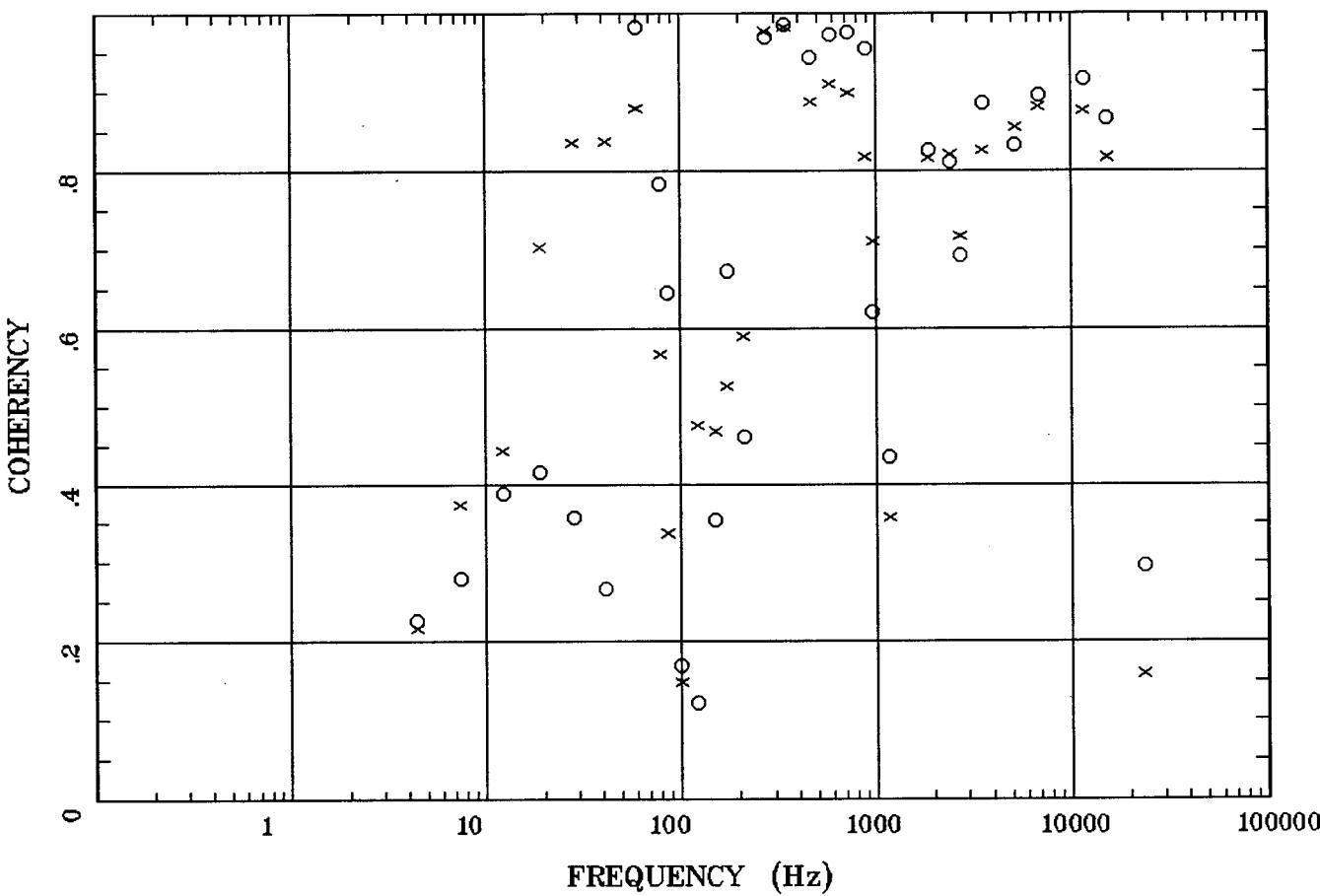
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:11 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

HzHx.x Coh HzHy.o

Priority 4

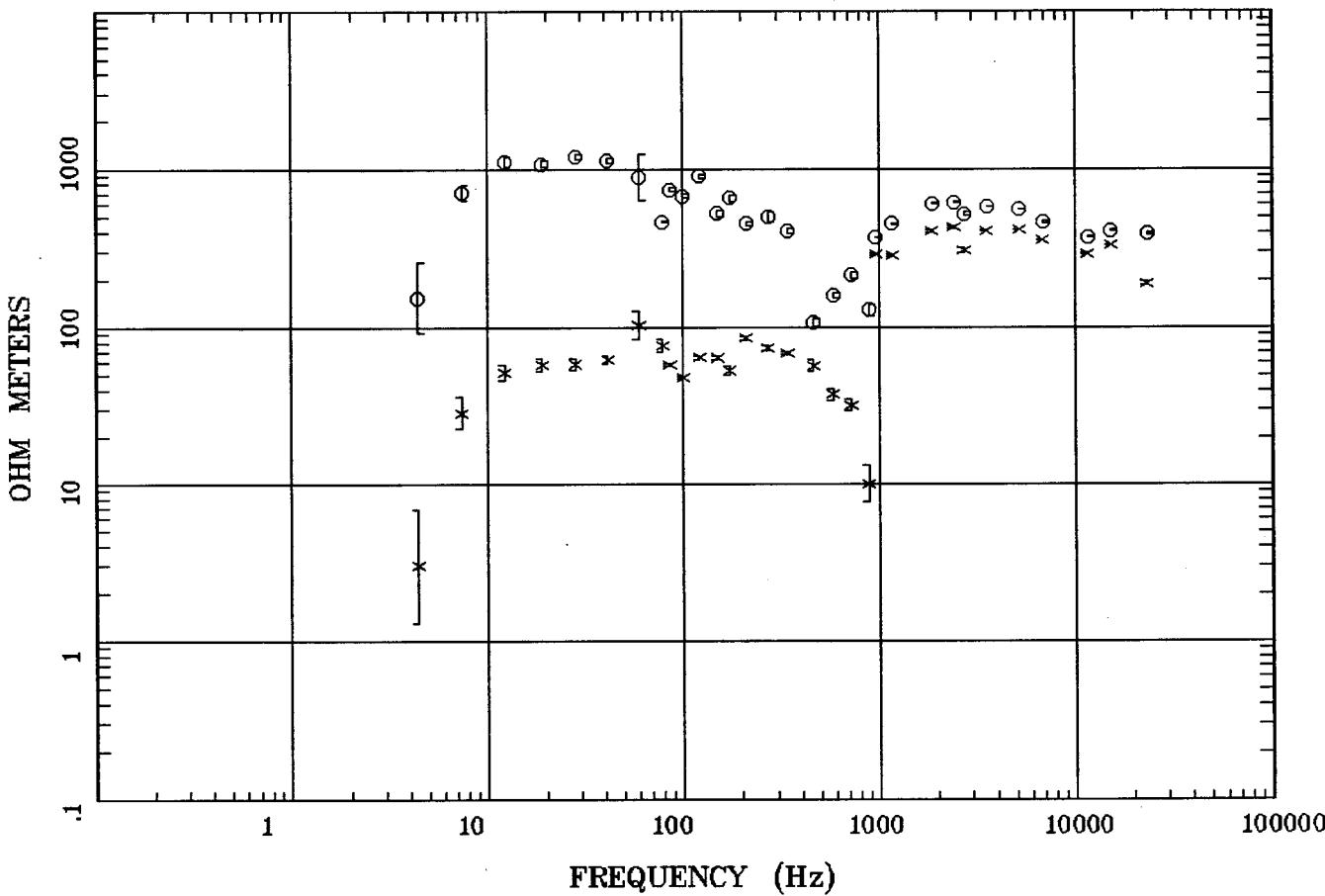


Client: Water Resources  
Remote: none  
Acquired: 14:0 Nov 03, 2003  
Survey Co:USGS

Rotation:  
Filename: nts45.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 11:11 Dec 09, 2004  
< EMI - ElectroMagnetic Instruments >

## APPARENT RESISTIVITY

Priority 4



Client: Water Resources

Remote: none

Acquired: 17:5 Nov 03, 2003

Survey Co:USGS

Rotation:

Filename: nts46.avg

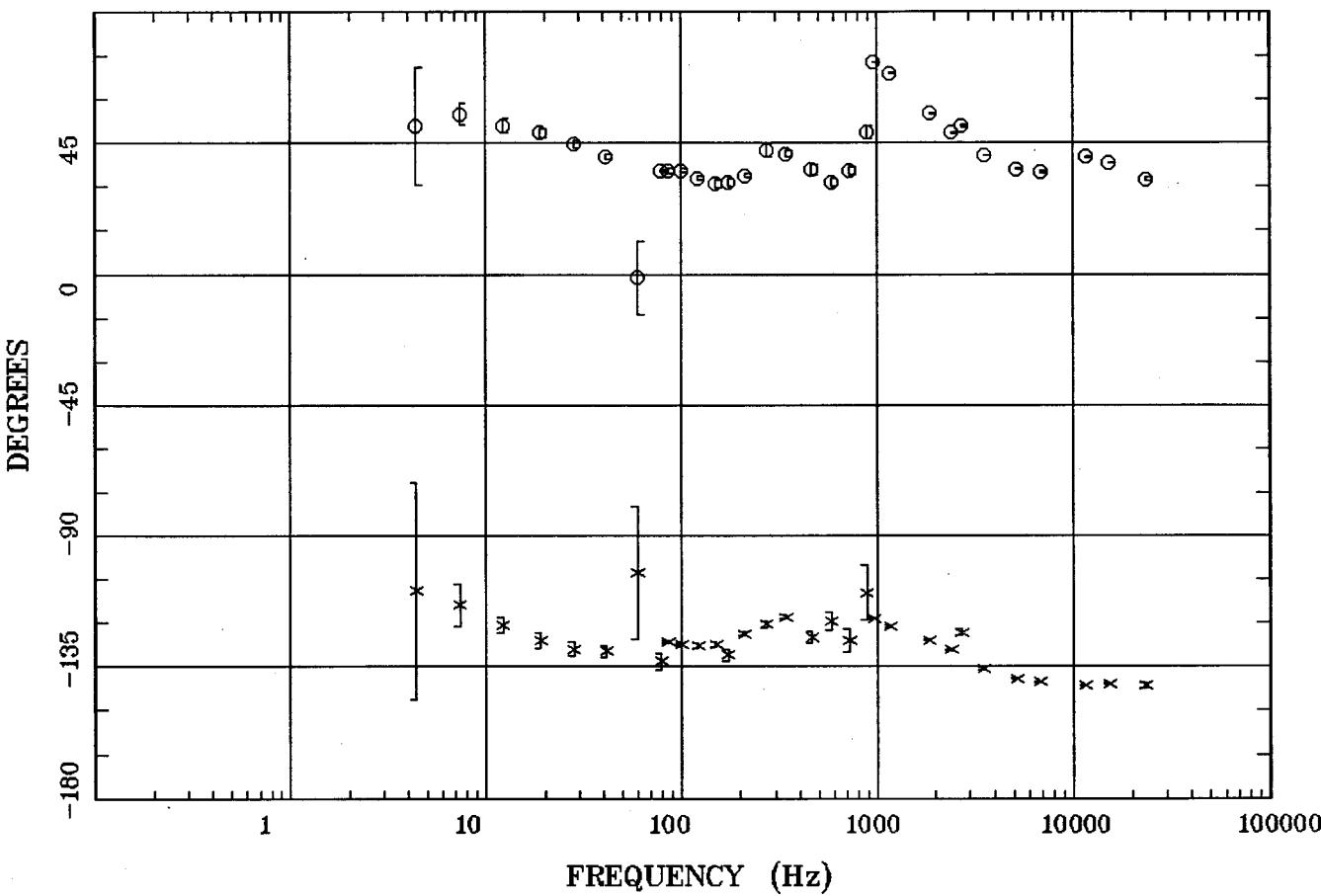
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:11 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## IMPEDANCE PHASE

Priority 4



Client: Water Resources

Remote: none

Acquired: 17:5 Nov 03, 2003

Survey Co:USGS

Rotation:

Filename: nts46.avg

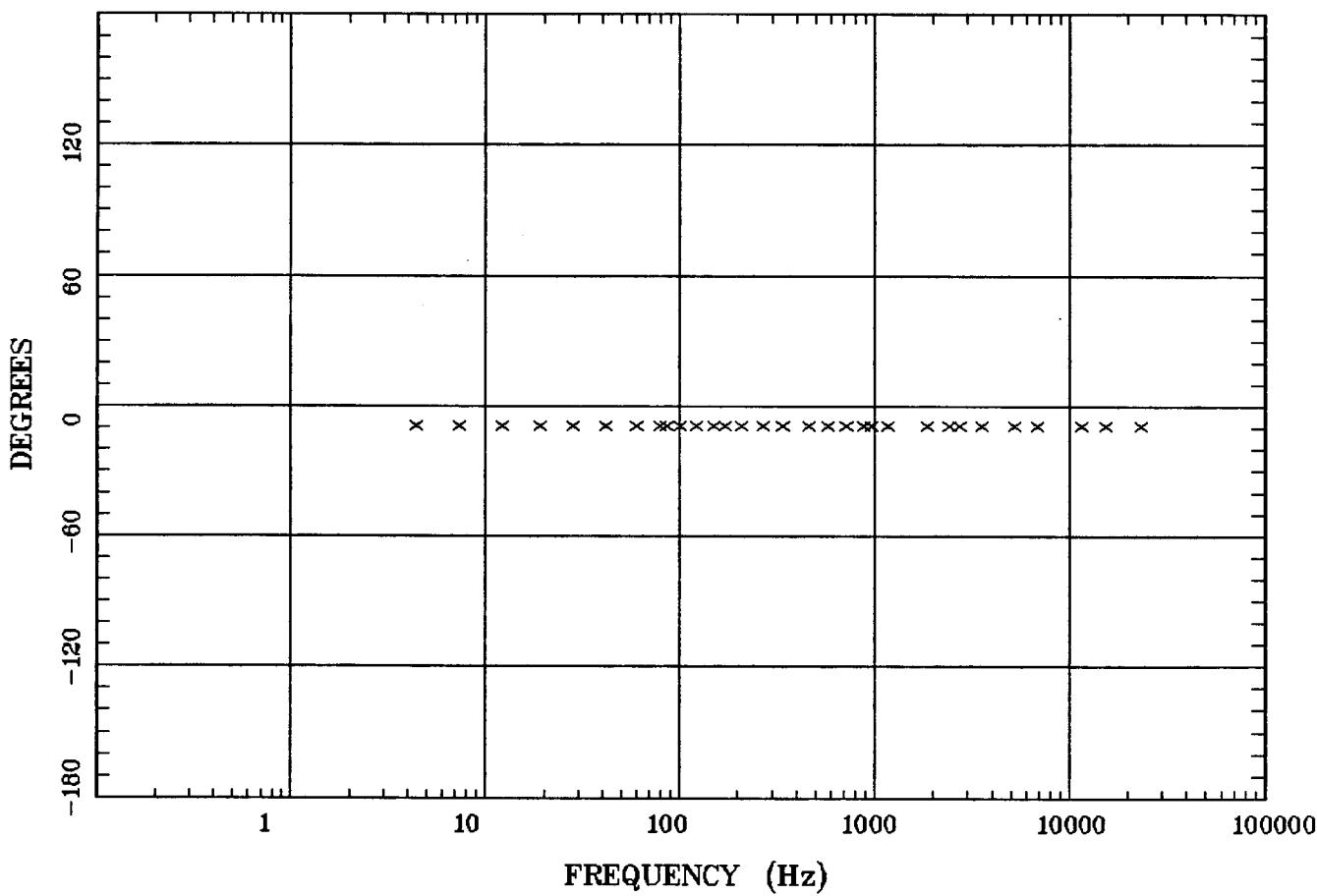
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:11 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## ROTATION ANGLE

Priority 4

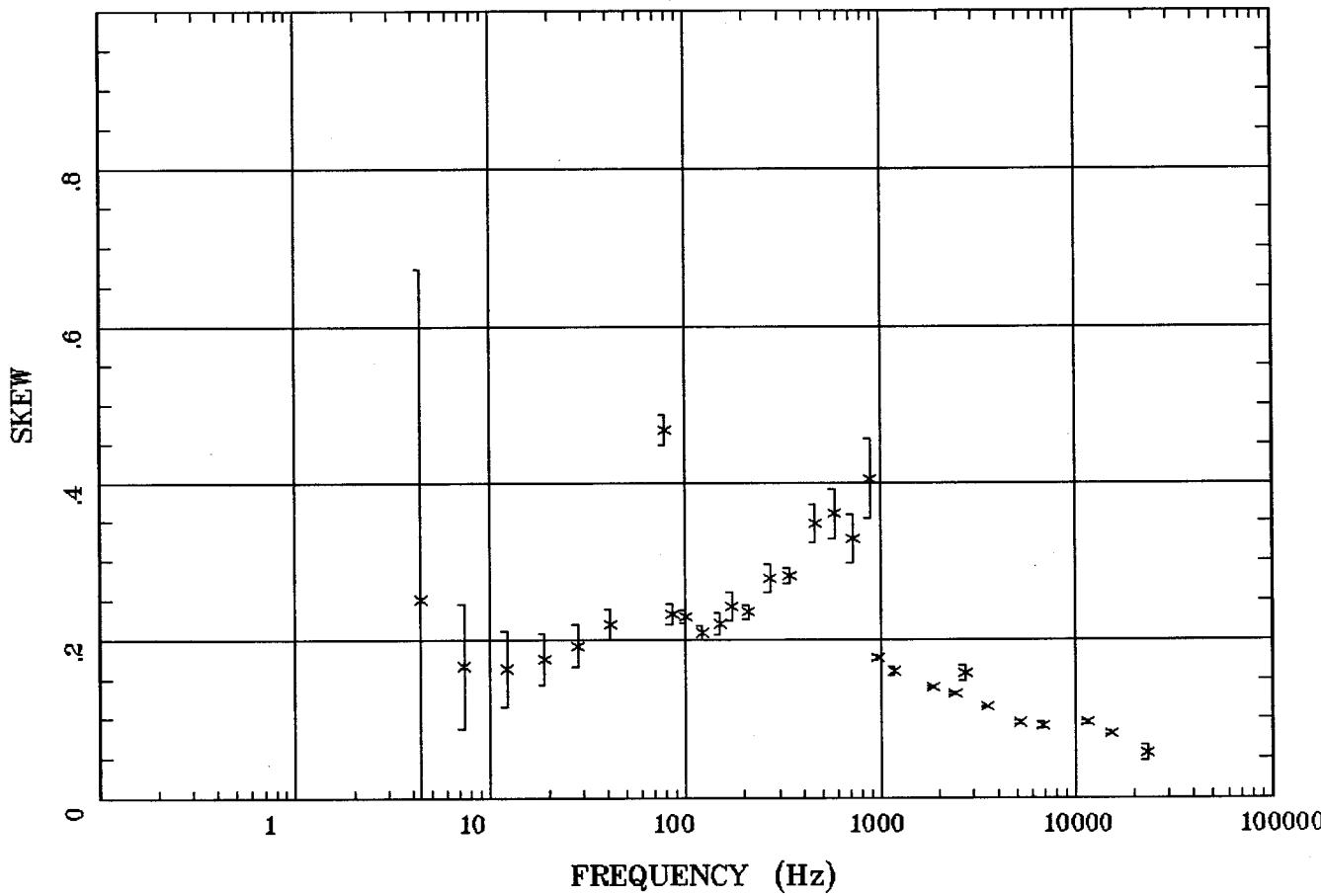


Client: Water Resources  
Remote: none  
Acquired: 17:5 Nov 03, 2003  
Survey Co:USGS

Rotation:  
Filename: nts46.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 11:11 Dec 09, 2004  
< EMI - ElectroMagnetic Instruments >

## IMPEDANCE SKEW

Priority 4

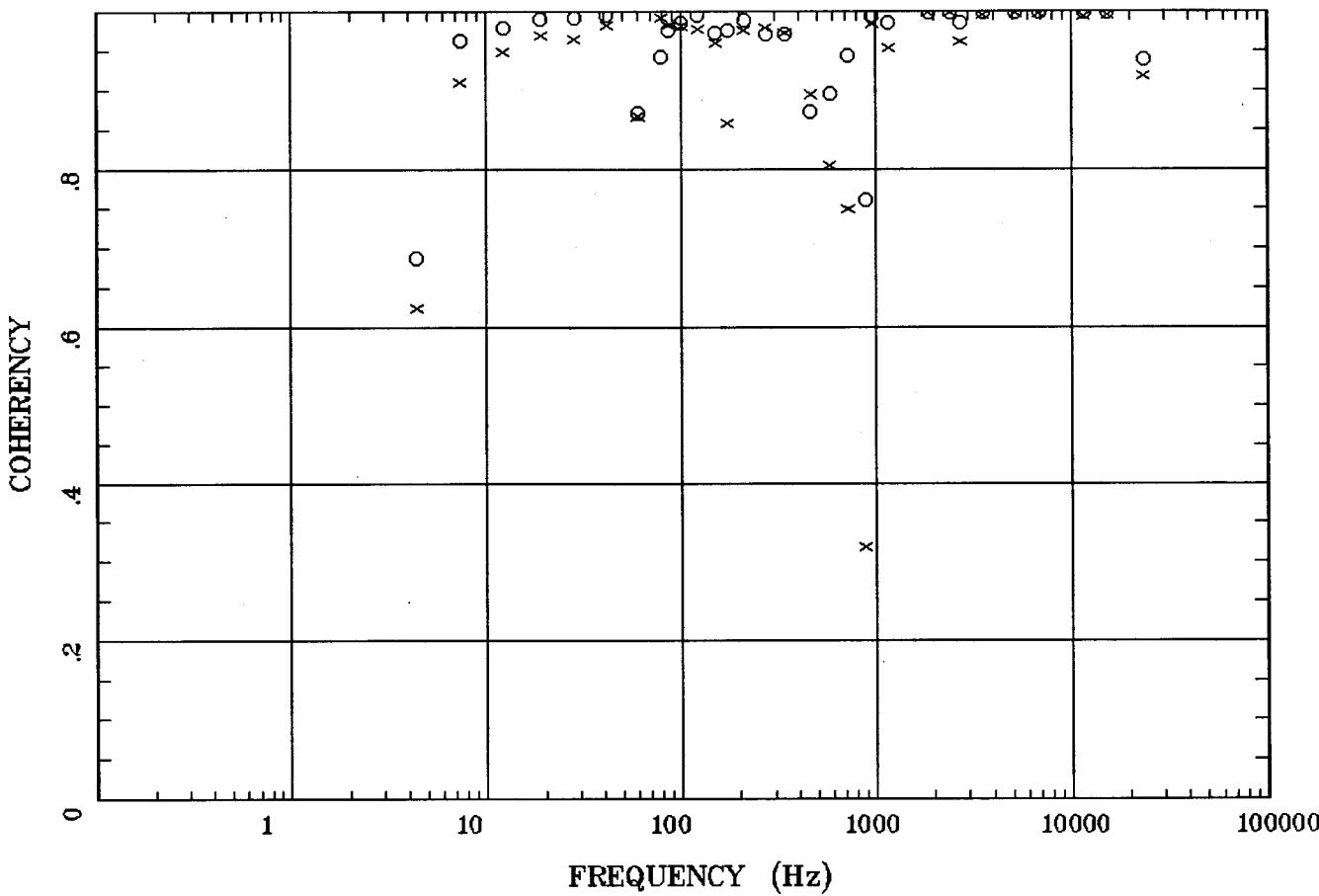


Client: Water Resources  
Remote: none  
Acquired: 17:5 Nov 03, 2003  
Survey Co:USGS

Rotation:  
Filename: nts46.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 11:11 Dec 09, 2004  
< EMI - ElectroMagnetic Instruments >

E MULT Coh.

Priority 4



Client: Water Resources

Remote: none

Acquired: 17:5 Nov 03, 2003

Survey Co:USGS

Rotation:

Filename: nts46.avg

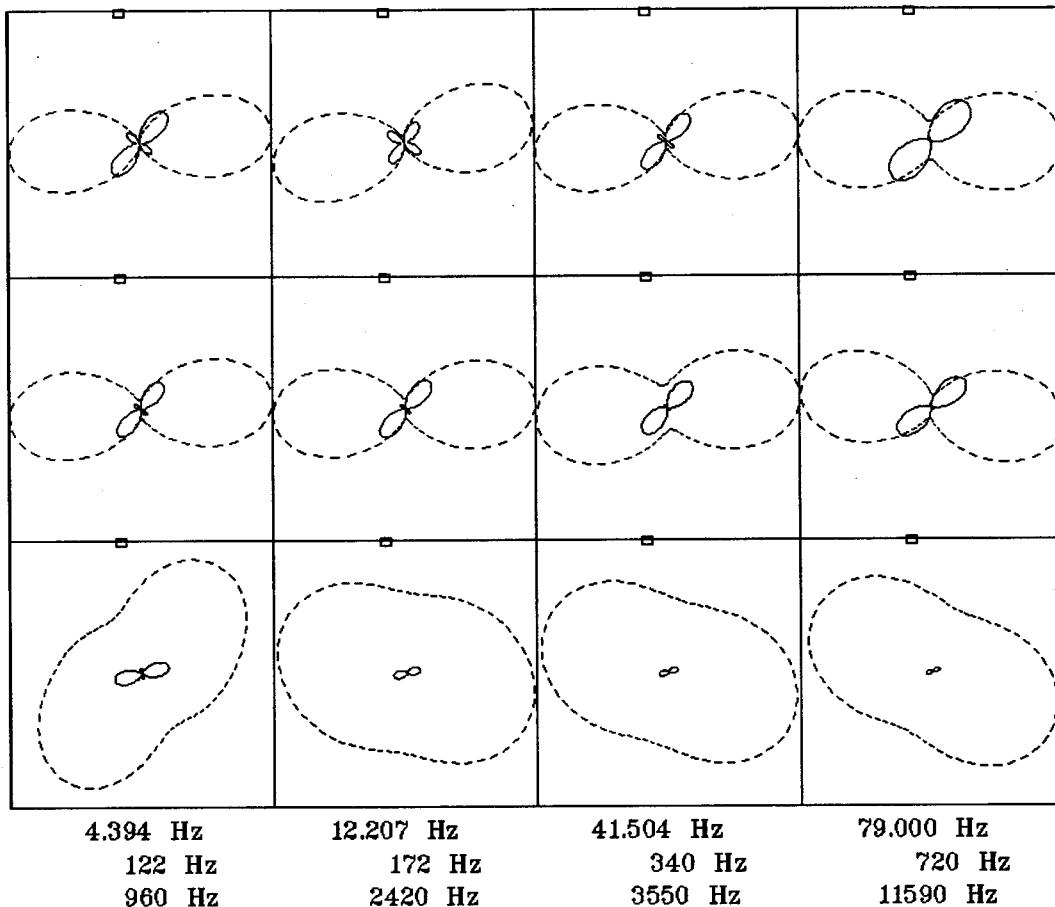
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:11 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## POLAR PLOTS

Priority 4



Client: Water Resources

Remote: none

Acquired: 17:5 Nov 03, 2003

Survey Co:USGS

Rotation:

Filename: nts46.avg

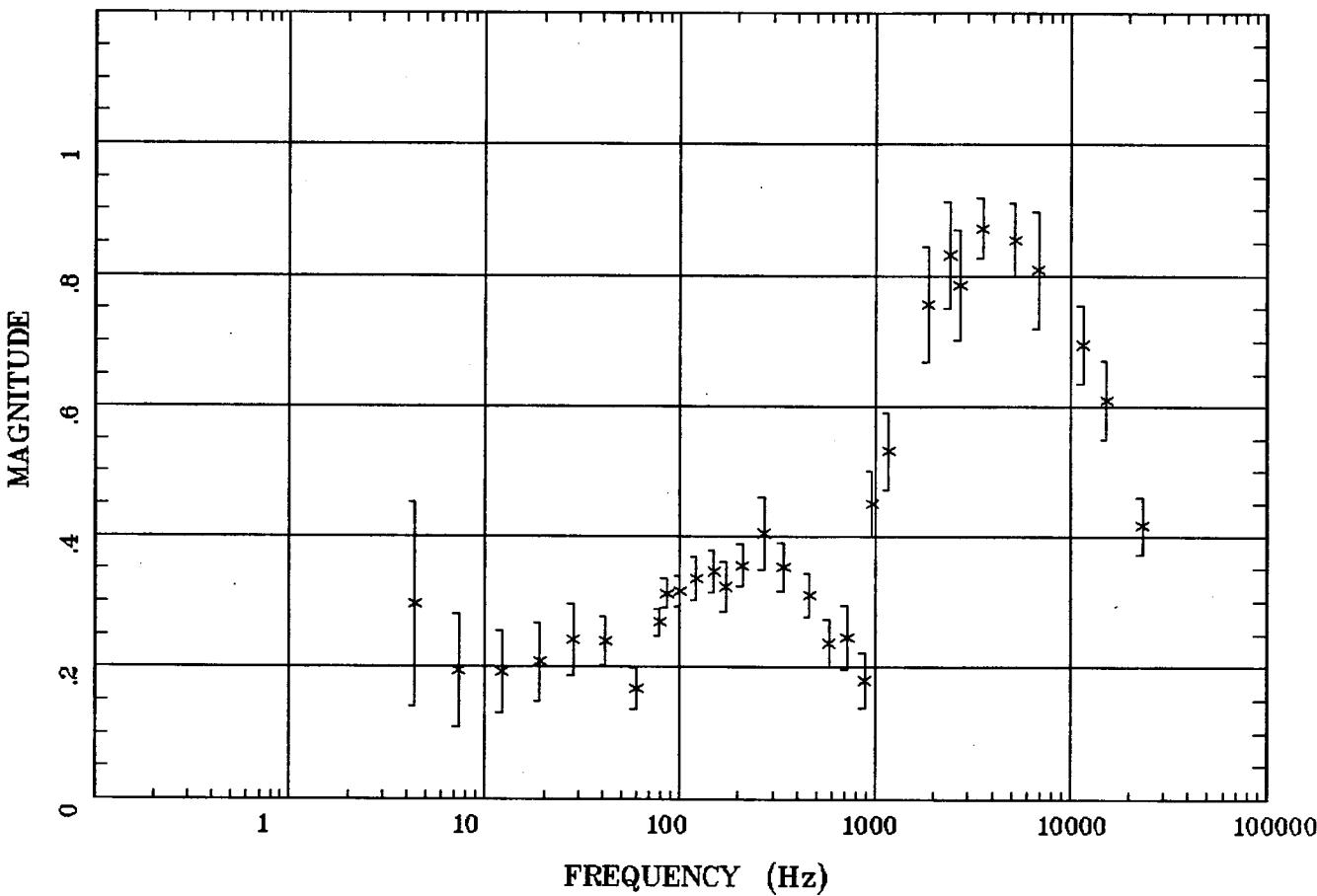
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:11 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## TIPPER MAGNITUDE

Priority 4



Client: Water Resources

Remote: none

Acquired: 17:5 Nov 03, 2003

Survey Co:USGS

Rotation:

Filename: nts46.avg

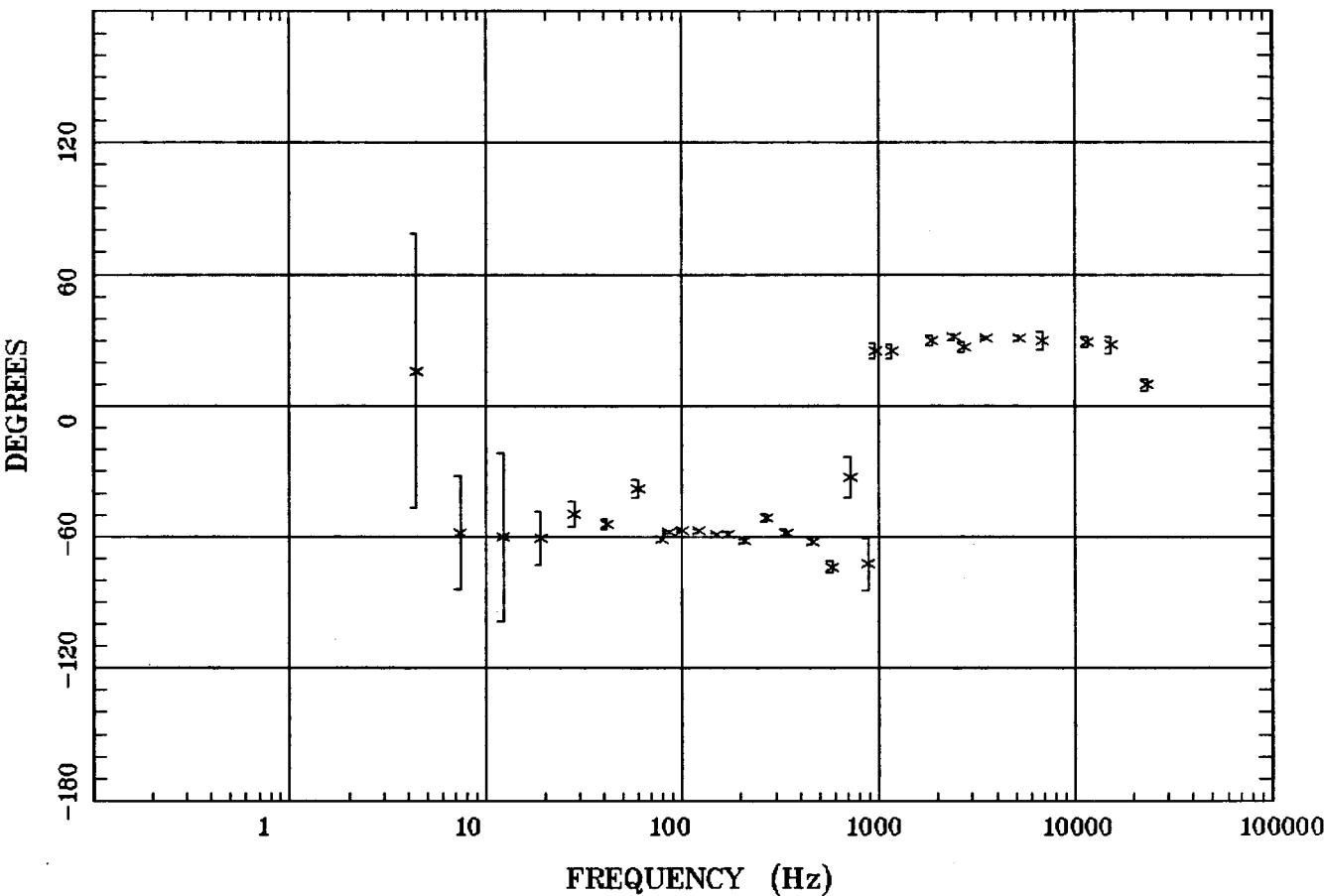
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:12 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## TIPPER STRIKE

Priority 4

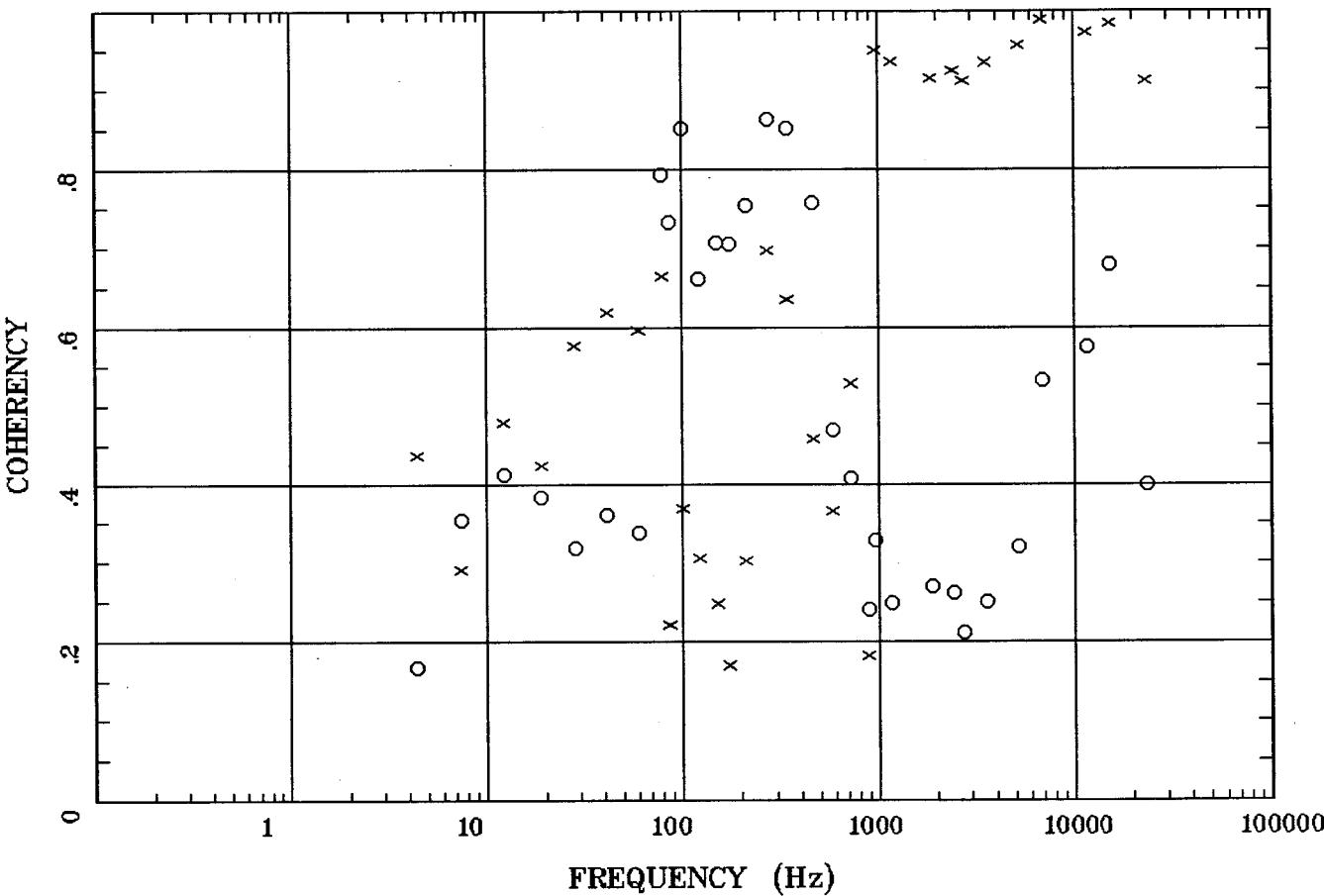


Client: Water Resources  
Remote: none  
Acquired: 17:5 Nov 03, 2003  
Survey Co:USGS

Rotation:  
Filename: nts46.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 11:12 Dec 09, 2004  
< EMI - ElectroMagnetic Instruments >

HzHx.x Coh HzHy.o

Priority 4



Client: Water Resources

Remote: none

Acquired: 17:5 Nov 03, 2003

Survey Co:USGS

Rotation:

Filename: nts46.avg

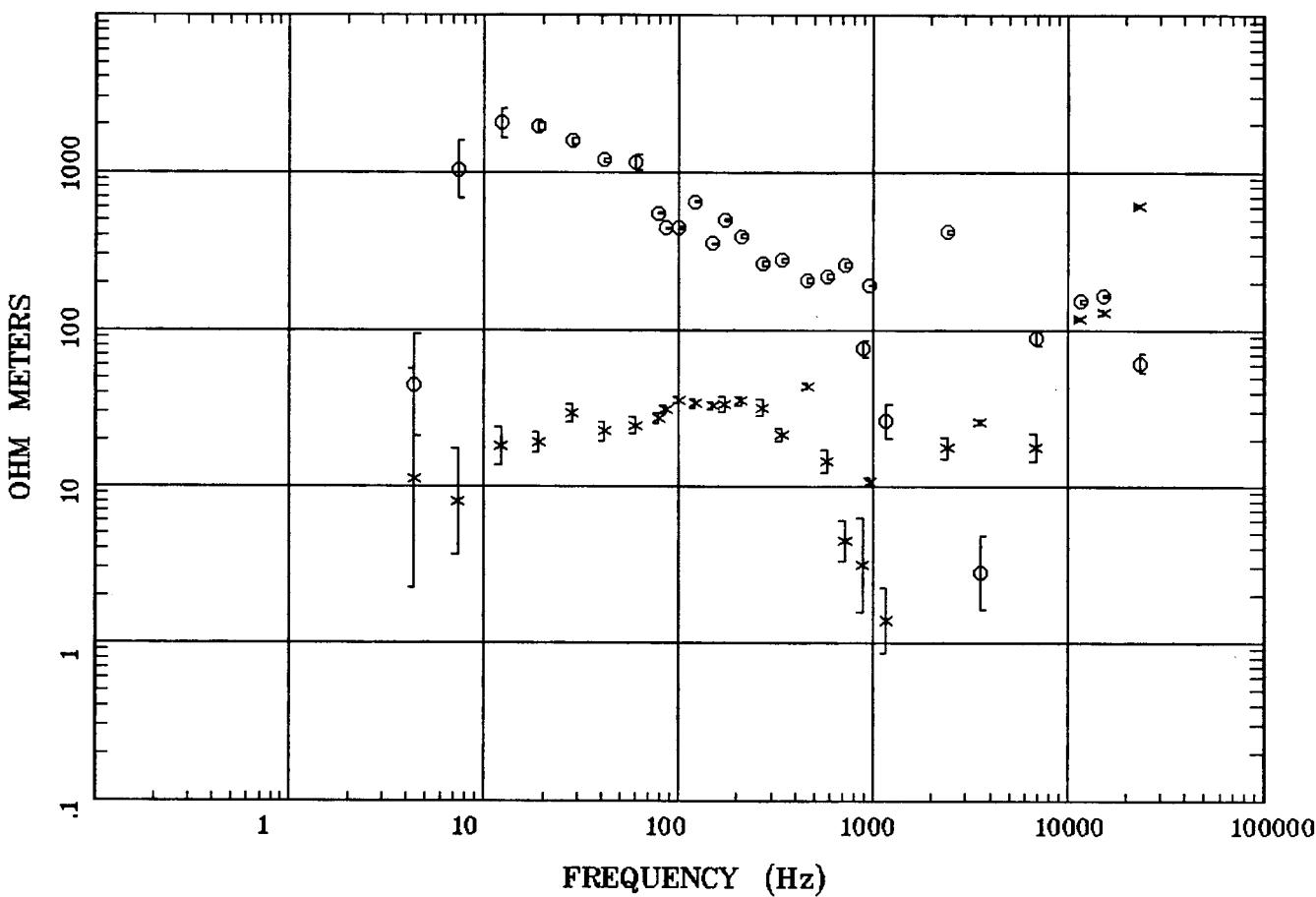
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:12 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## APPARENT RESISTIVITY

Priority 4

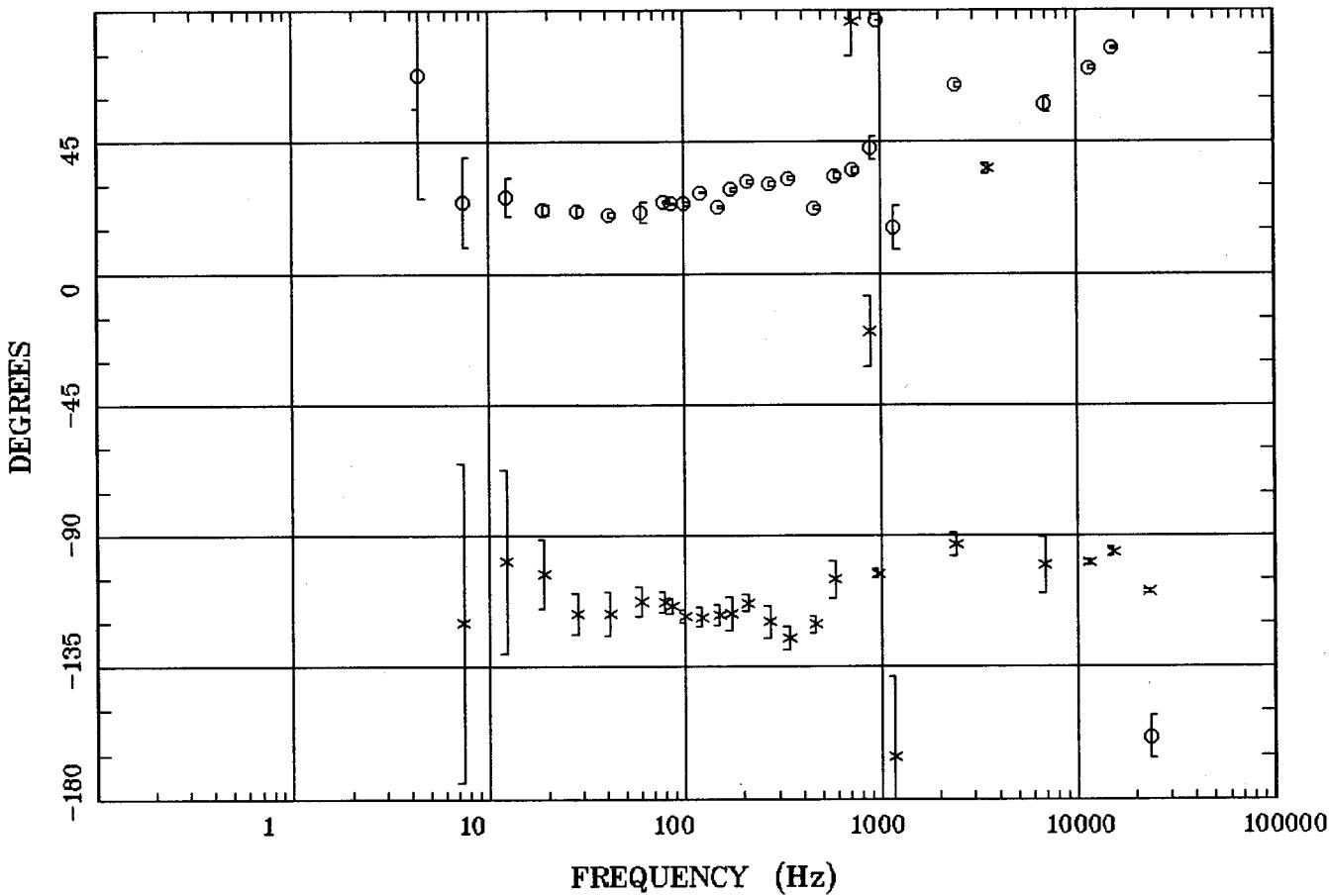


Client: Water Resources  
Remote: none  
Acquired: 12:4 Nov 01, 2003  
Survey Co:USGS

Rotation:  
Filename: nts47.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 11:12 Dec 09, 2004  
< EMI - ElectroMagnetic Instruments >

## IMPEDANCE PHASE

Priority 4



Client: Water Resources

Remote: none

Acquired: 12:4 Nov 01, 2003

Survey Co:USGS

Rotation:

Filename: nts47.avg

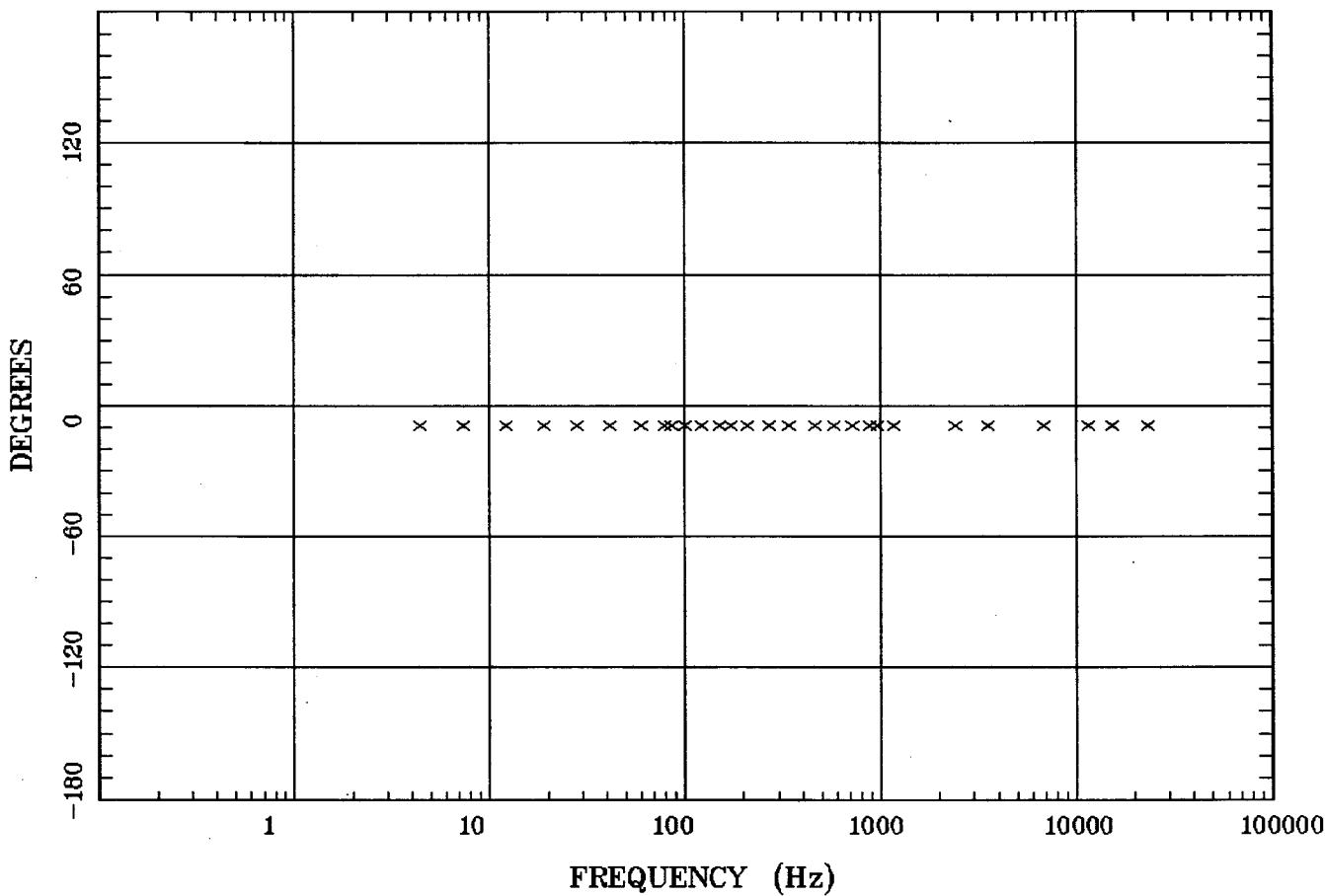
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:12 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## ROTATION ANGLE

Priority 4



Client: Water Resources

Remote: none

Acquired: 12:4 Nov 01, 2003

Survey Co:USGS

Rotation:

Filename: nts47.avg

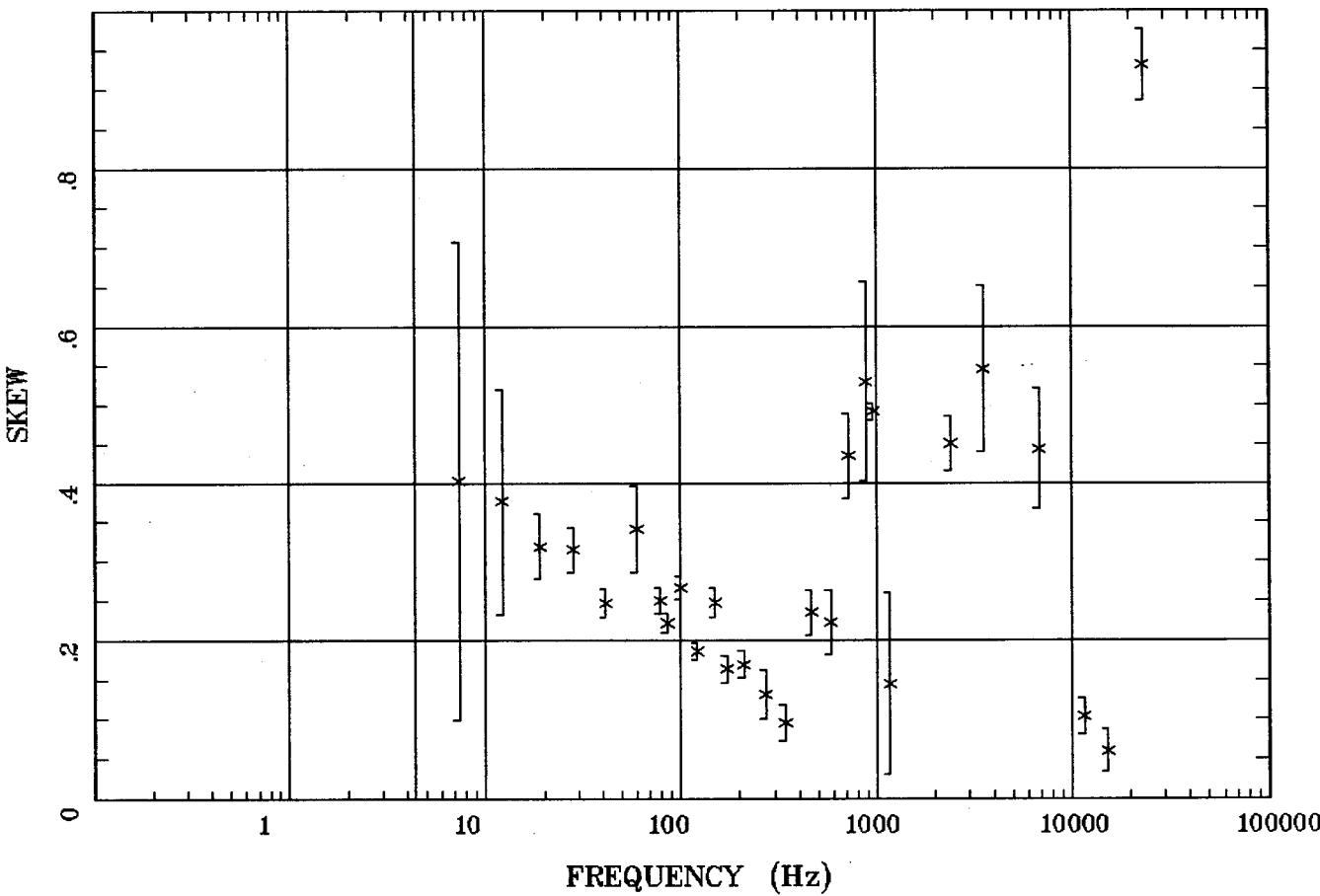
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:12 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## IMPEDANCE SKEW

Priority 4



Client: Water Resources

Remote: none

Acquired: 12:4 Nov 01, 2003

Survey Co:USGS

Rotation:

Filename: nts47.avg

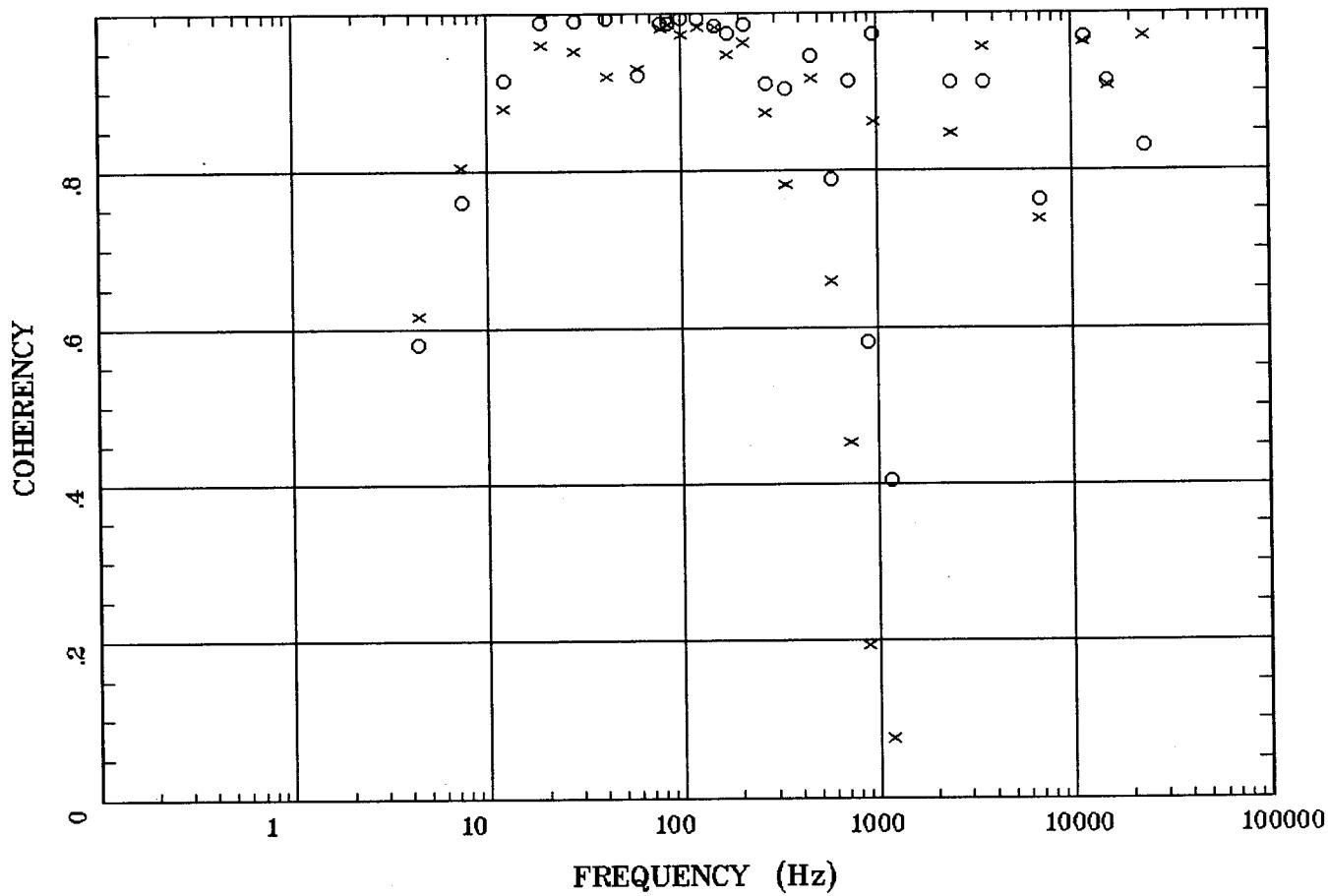
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:12 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

E MULT Coh.

Priority 4



Client: Water Resources

Remote: none

Acquired: 12:4 Nov 01, 2003

Survey Co:USGS

Rotation:

Filename: nts47.avg

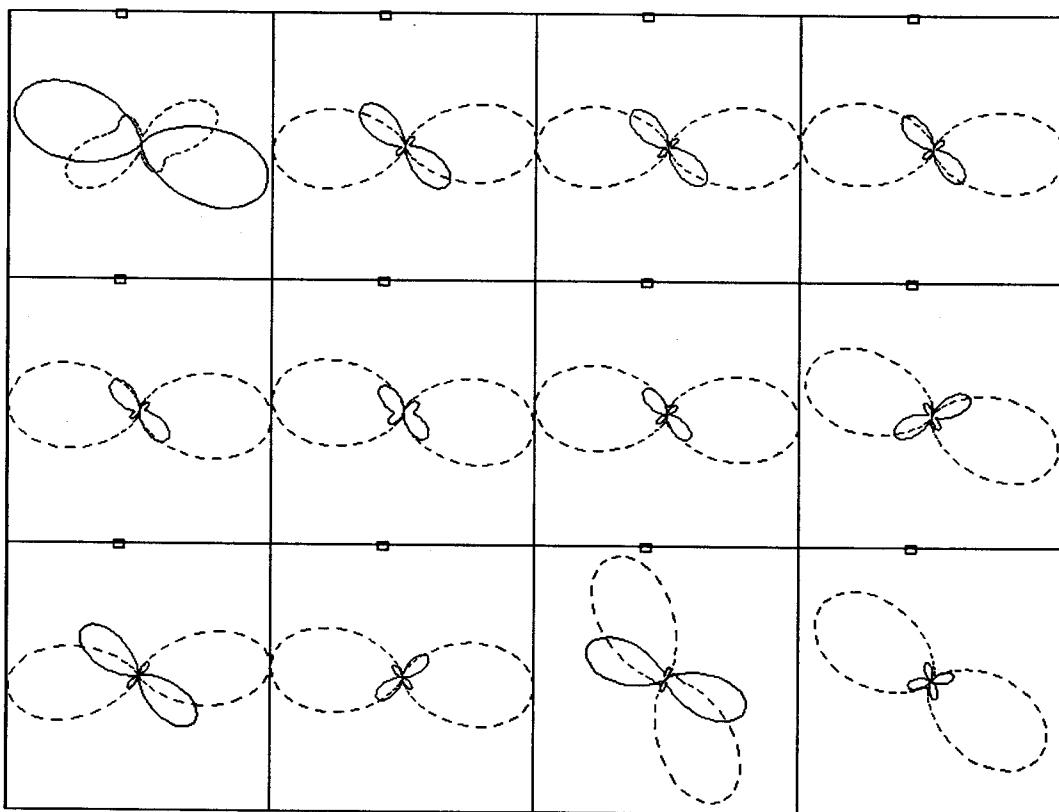
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:12 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## POLAR PLOTS

Priority 4



4.394 Hz

12.207 Hz

28.320 Hz

79.000 Hz

\*\*\*\*\* Hz

150 Hz

210 Hz

460 Hz

720 Hz

1170 Hz

3550 Hz

11590 Hz

Client: Water Resources

Remote: none

Acquired: 12:4 Nov 01, 2003

Survey Co:USGS

Rotation:

Filename: nts47.avg

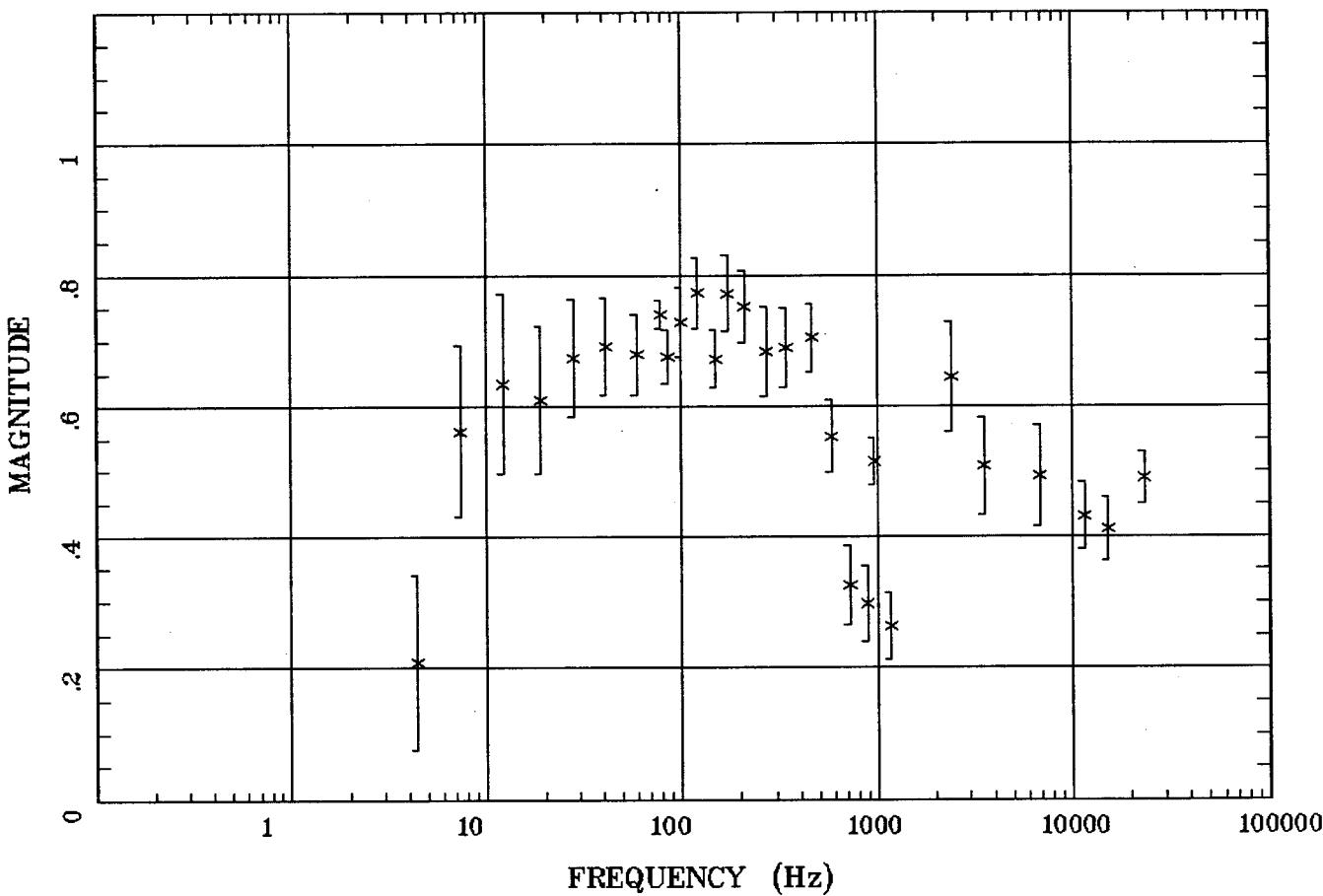
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:12 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## TIPPER MAGNITUDE

Priority 4



Client: Water Resources

Remote: none

Acquired: 12:4 Nov 01, 2003

Survey Co:USGS

Rotation:

Filename: nts47.avg

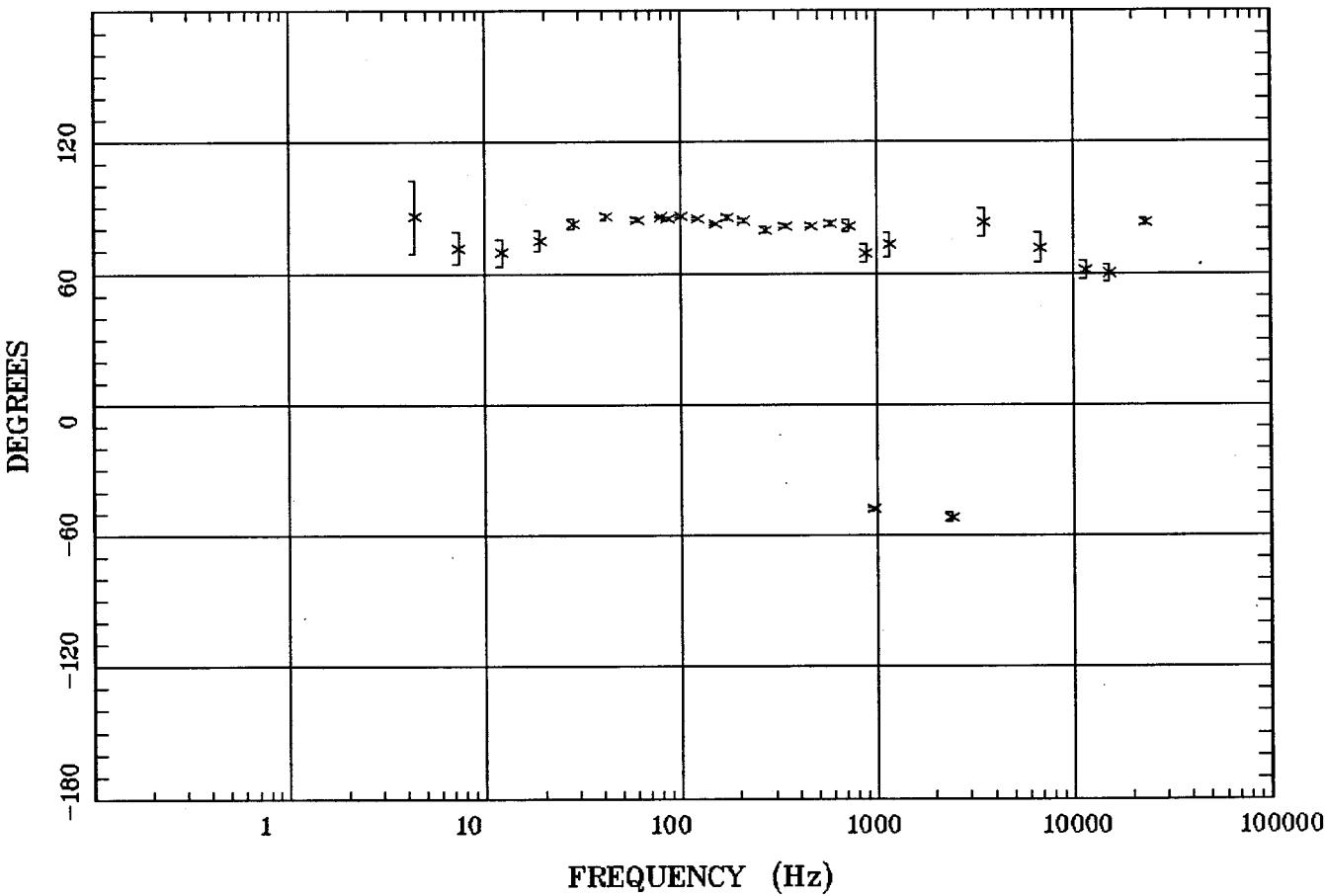
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:12 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

TIPPER STRIKE

Priority 4



Client: Water Resources

Remote: none

Acquired: 12:4 Nov 01, 2003

Survey Co:USGS

Rotation:

Filename: nts47.avg

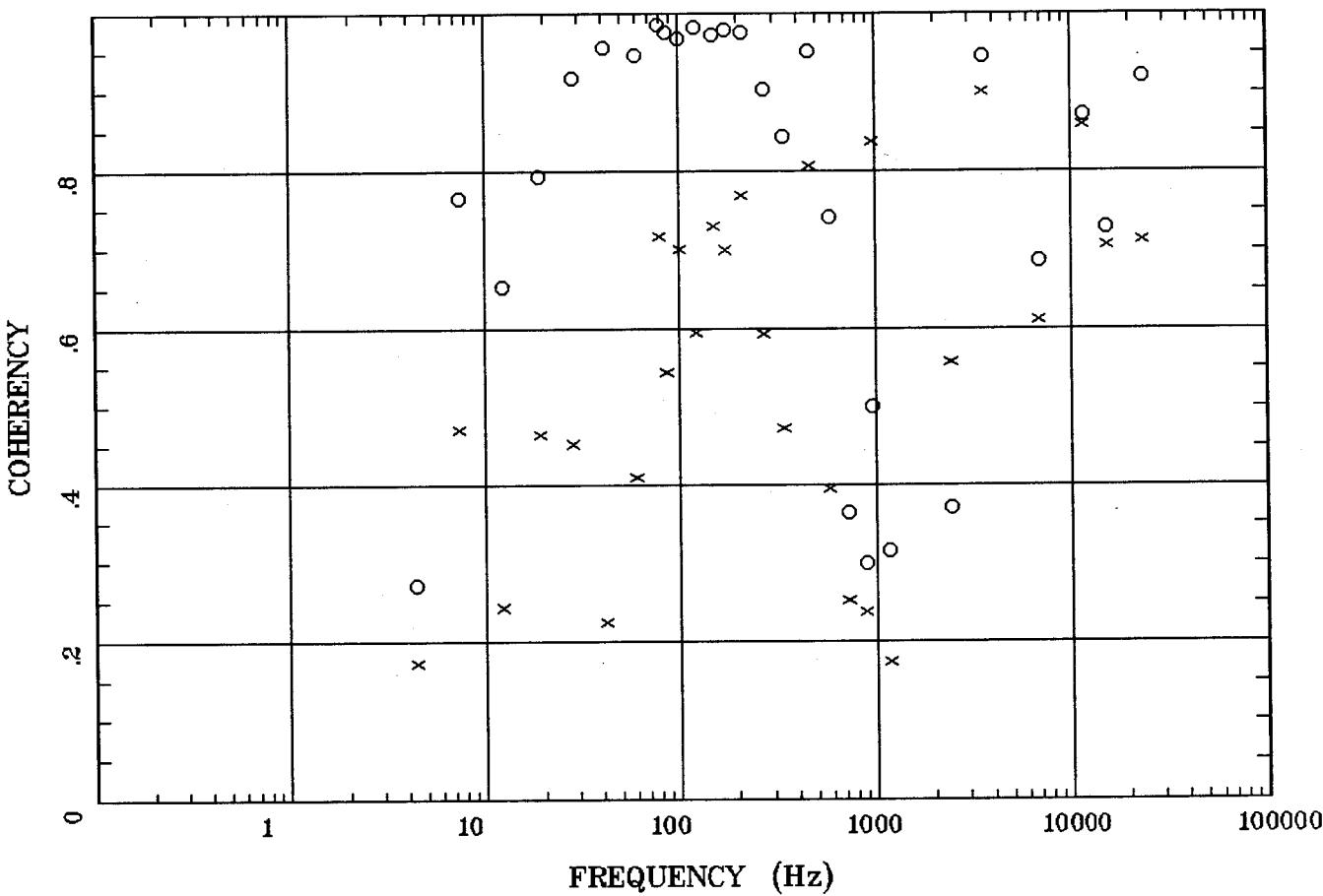
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:12 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

HzHx.x Coh HzHy.o

Priority 4



Client: Water Resources

Remote: none

Acquired: 12:4 Nov 01, 2003

Survey Co:USGS

Rotation:

Filename: nts47.avg

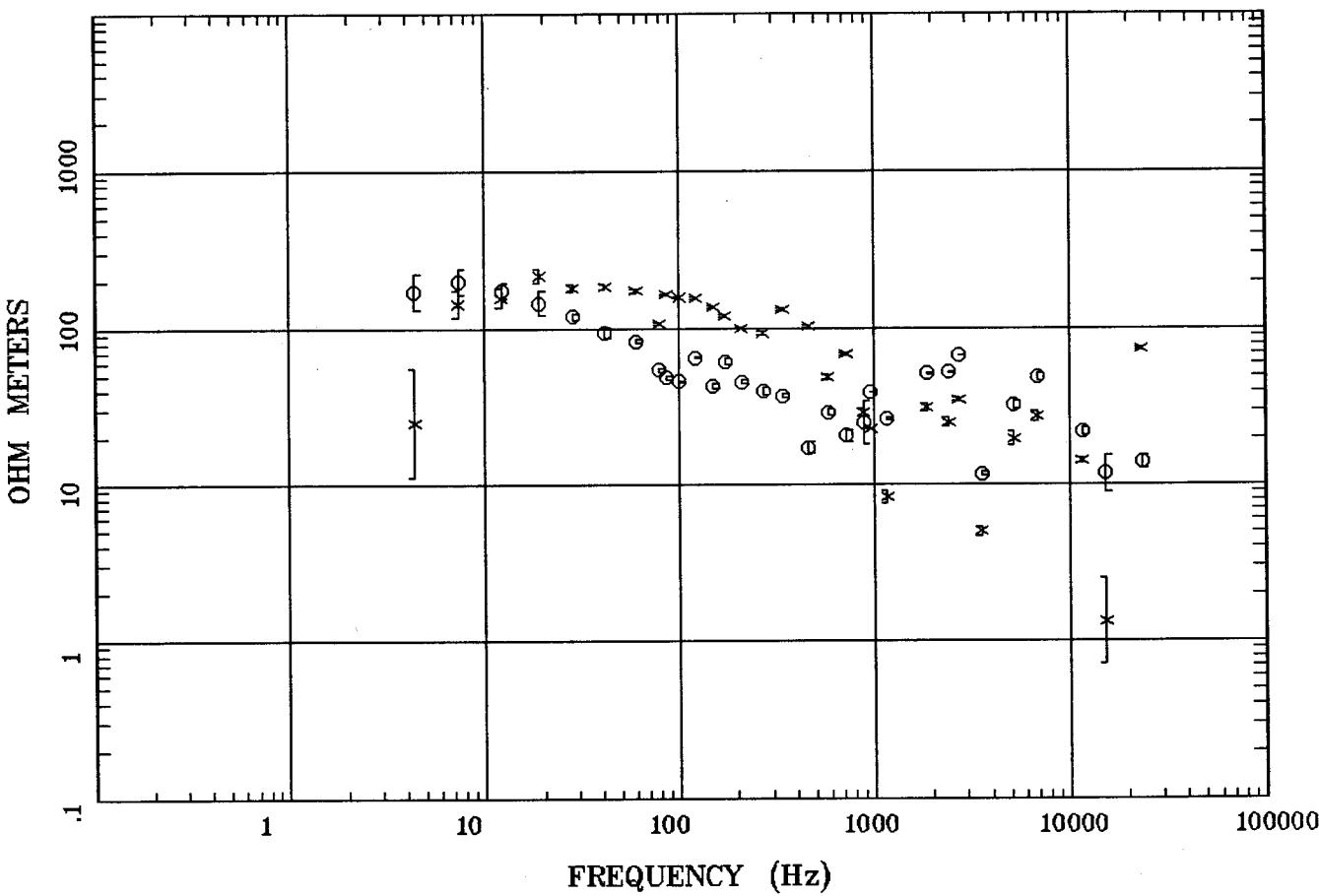
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:12 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## APPARENT RESISTIVITY

Priority 4



Client: Water Resources

Remote: none

Acquired: 13:3 Nov 02, 2003

Survey Co:USGS

Rotation:

Filename: nts48.avg

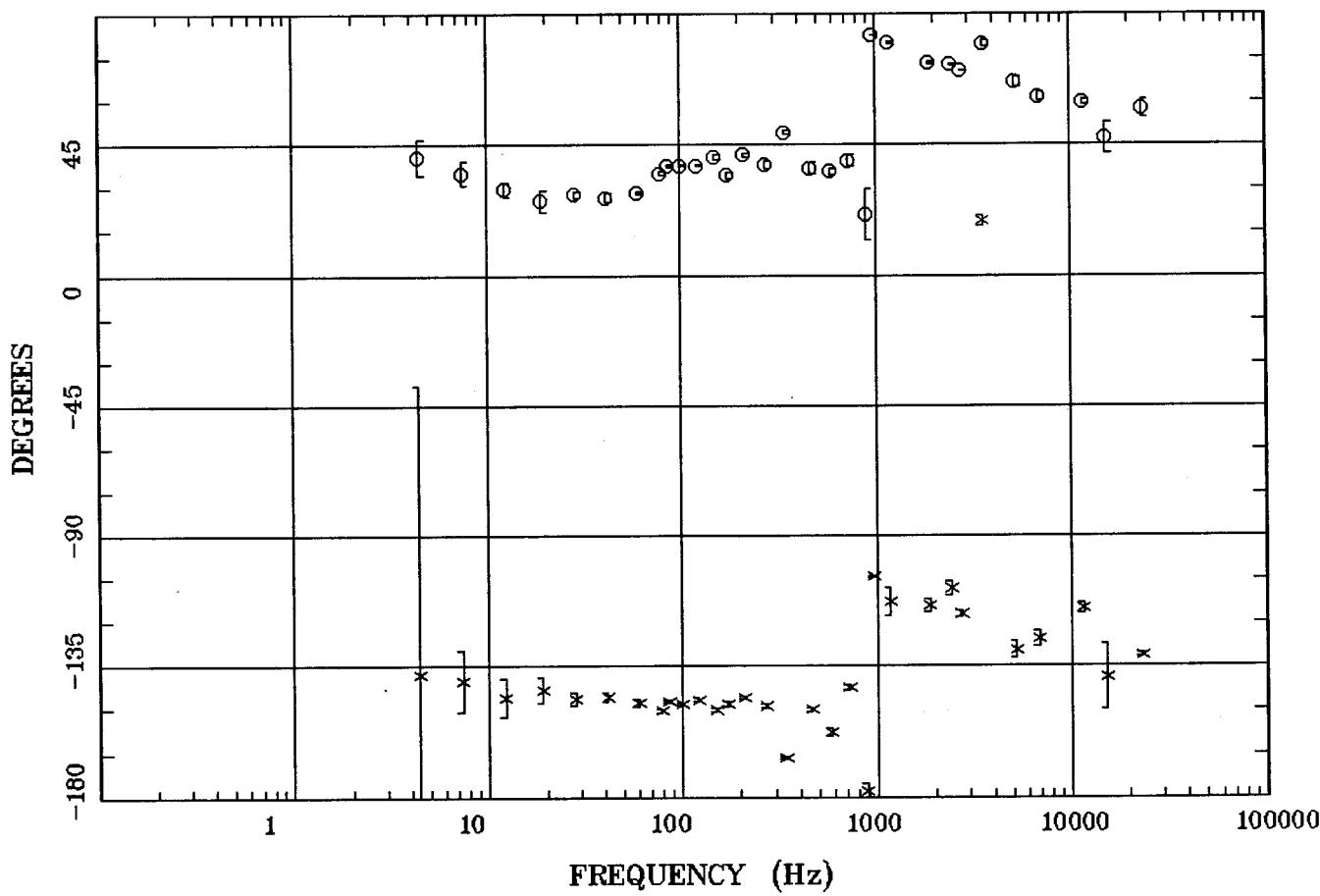
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:13 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## IMPEDANCE PHASE

Priority 4



Client: Water Resources

Remote: none

Acquired: 13:3 Nov 02, 2003

Survey Co:USGS

Rotation:

Filename: nts48.avg

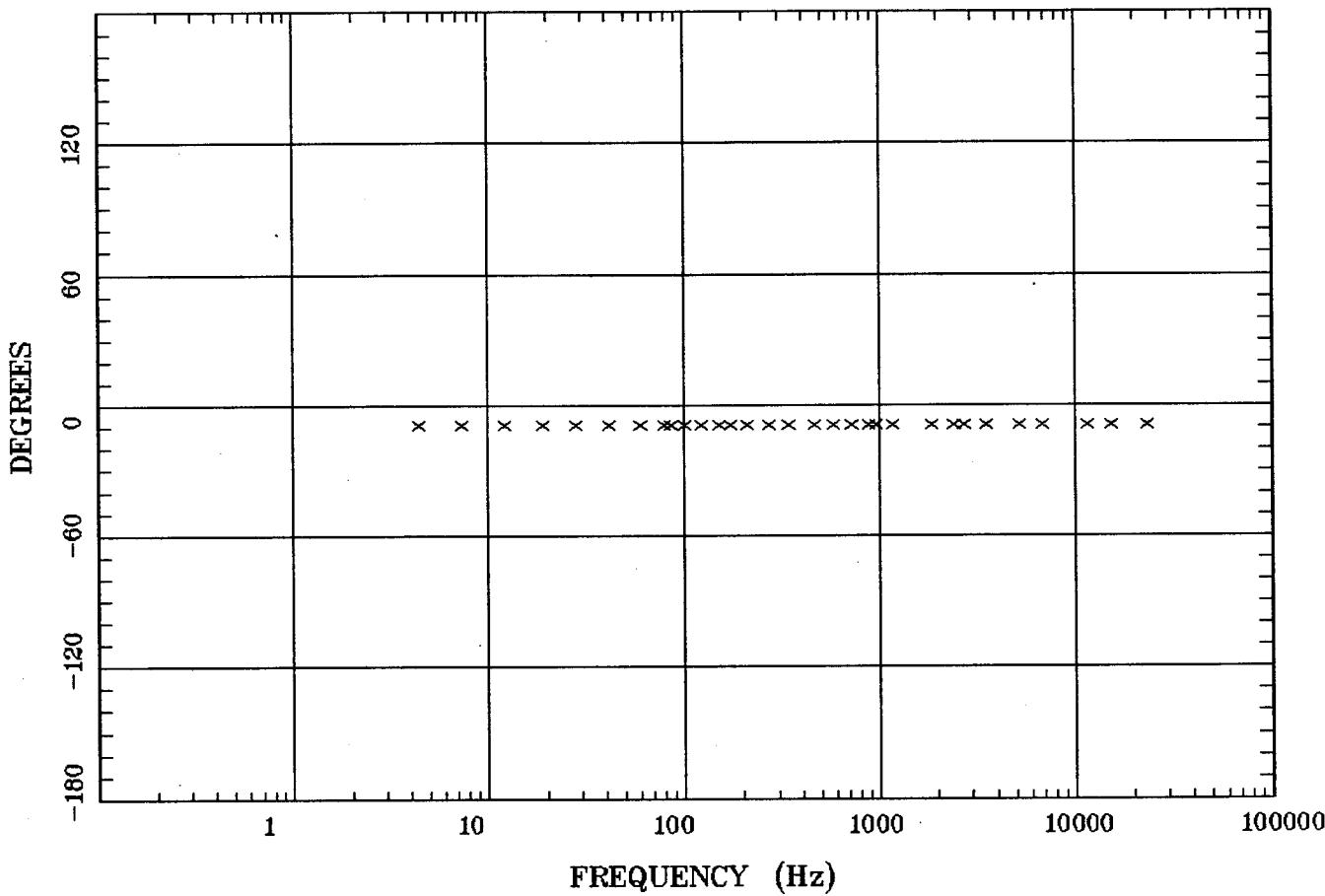
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:13 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## ROTATION ANGLE

Priority 4



Client: Water Resources

Remote: none

Acquired: 13:3 Nov 02, 2003

Survey Co:USGS

Rotation:

Filename: nts48.avg

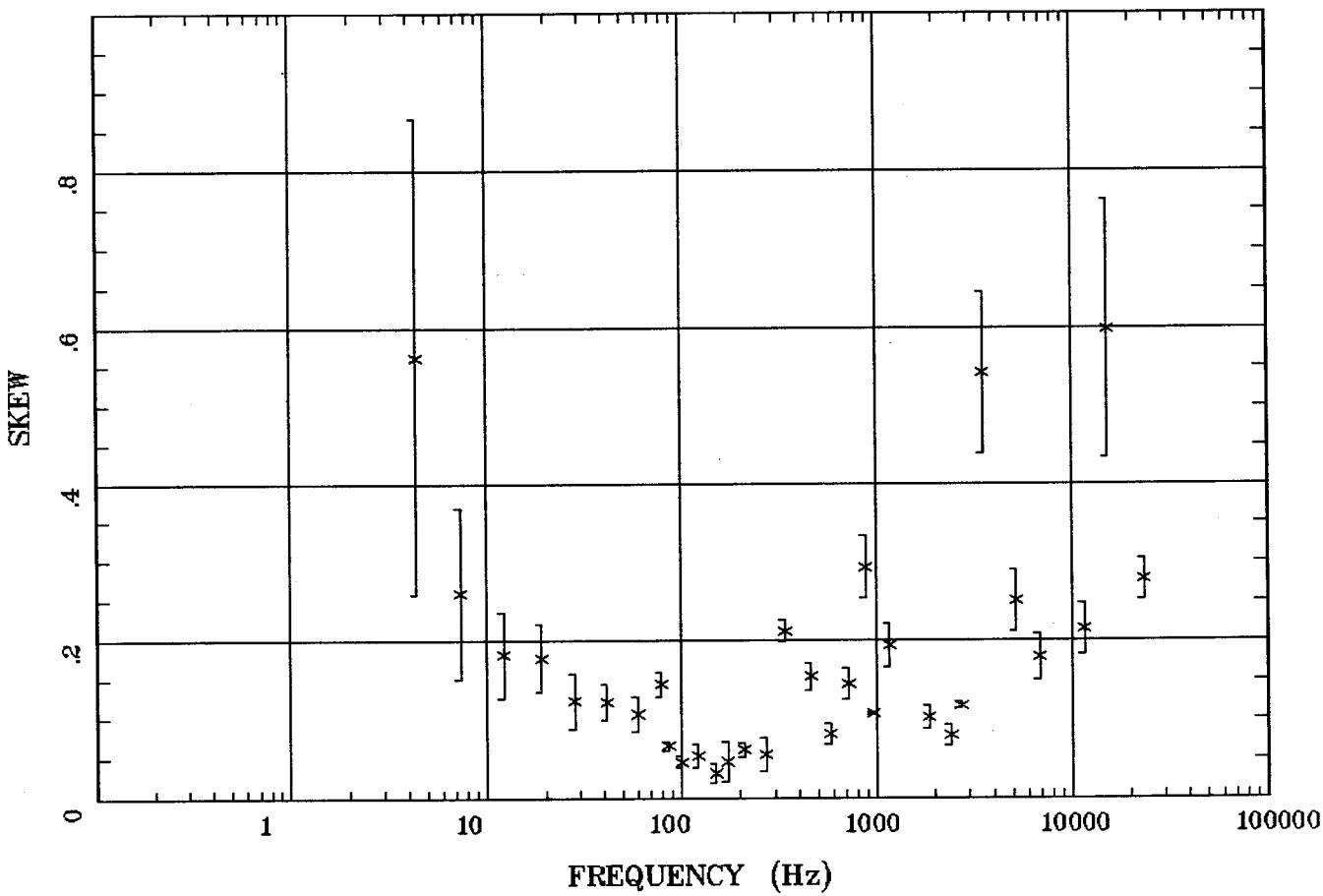
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:13 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## IMPEDANCE SKEW

Priority 4



Client: Water Resources

Remote: none

Acquired: 13:3 Nov 02, 2003

Survey Co:USGS

Rotation:

Filename: nts48.avg

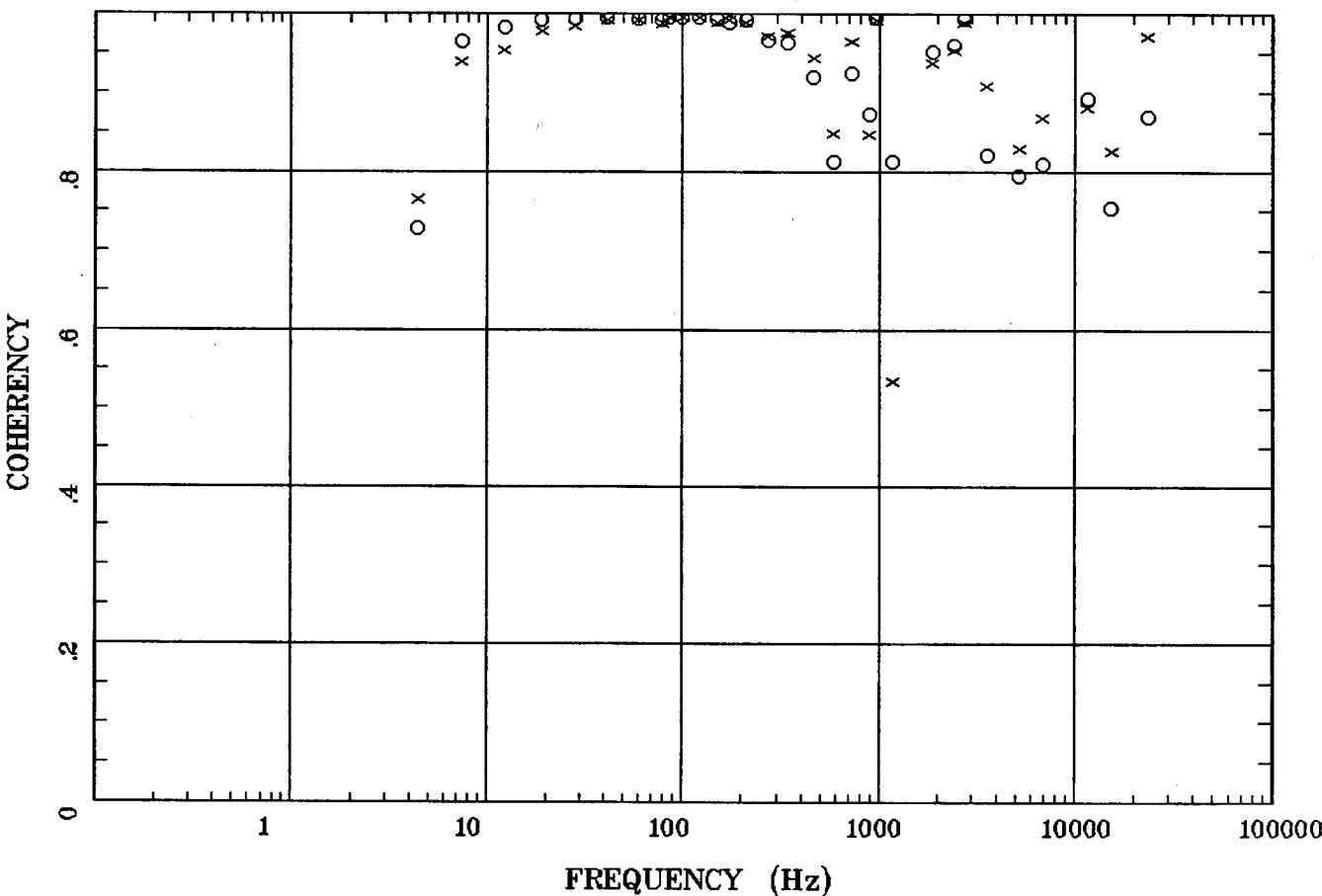
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:13 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

E MULT Coh.

Priority 4

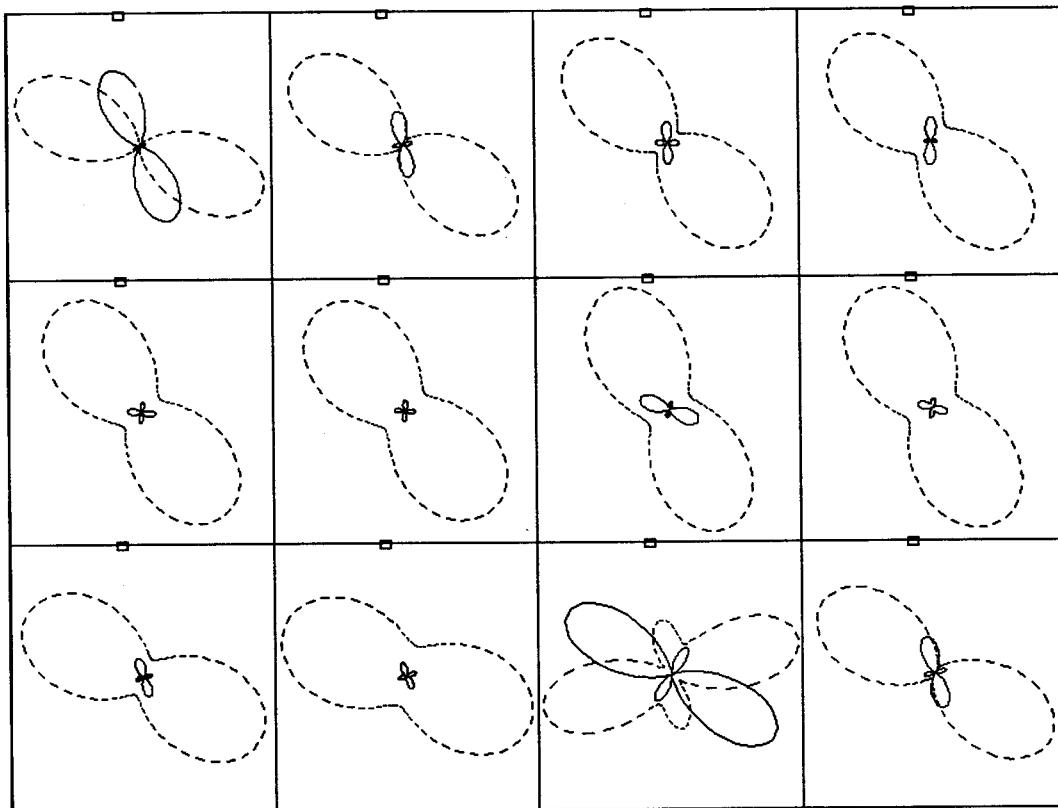


Client: Water Resources  
Remote: none  
Acquired: 13:3 Nov 02, 2003  
Survey Co:USGS

Rotation:  
Filename: nts48.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 11:13 Dec 09, 2004  
< EMI - ElectroMagnetic Instruments >

## POLAR PLOTS

Priority 4



4.394 Hz

122 Hz

960 Hz

12.207 Hz

172 Hz

2420 Hz

41.504 Hz

340 Hz

3550 Hz

79.000 Hz

720 Hz

11590 Hz

Rotation:

Client: Water Resources

Remote: none

Ch1

Ch2

Ch3

Ch4

Ch5

Ch6

Ch7

Acquired: 13:3 Nov 02, 2003

Survey Co:USGS

Filename: nts48.avg

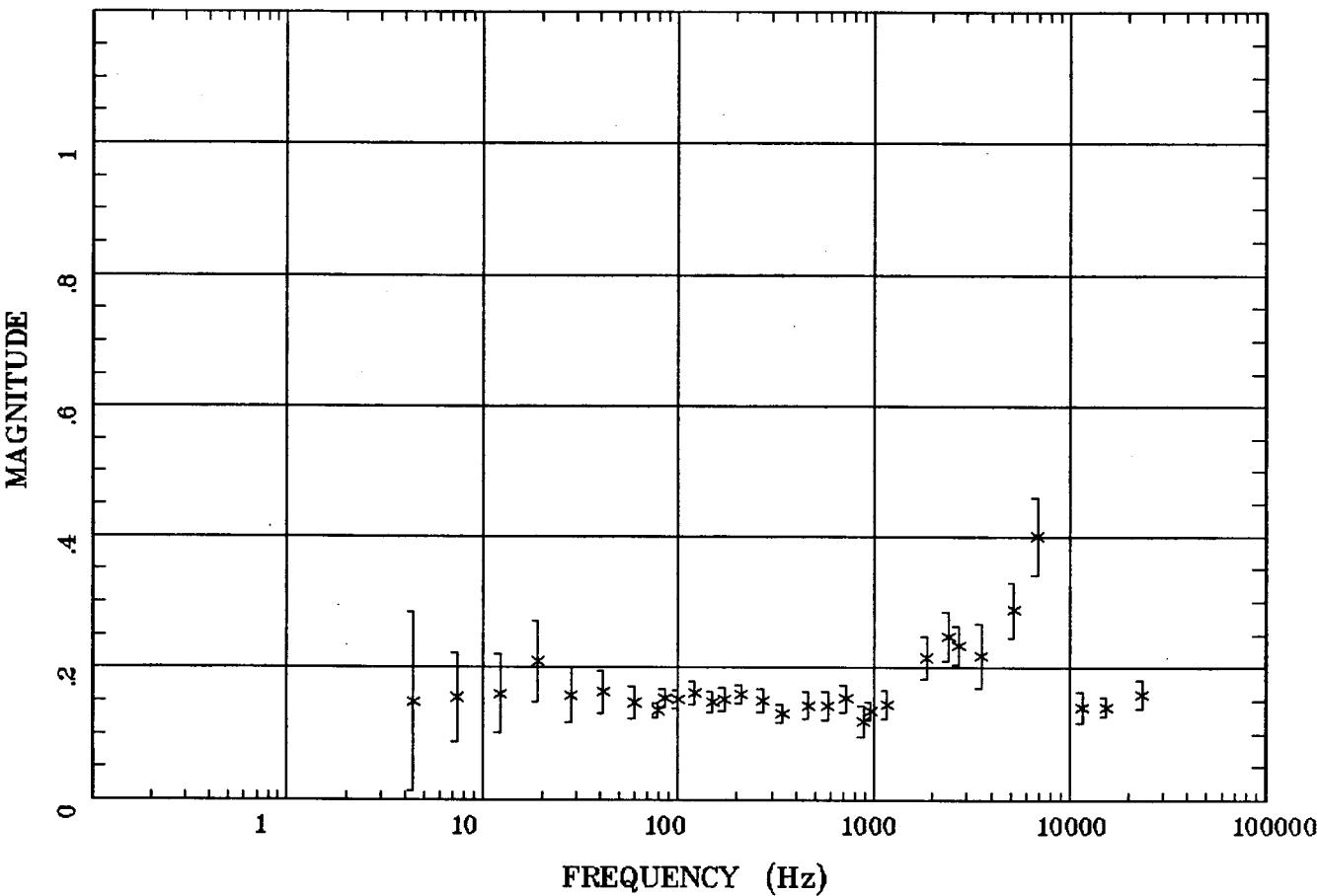
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:13 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

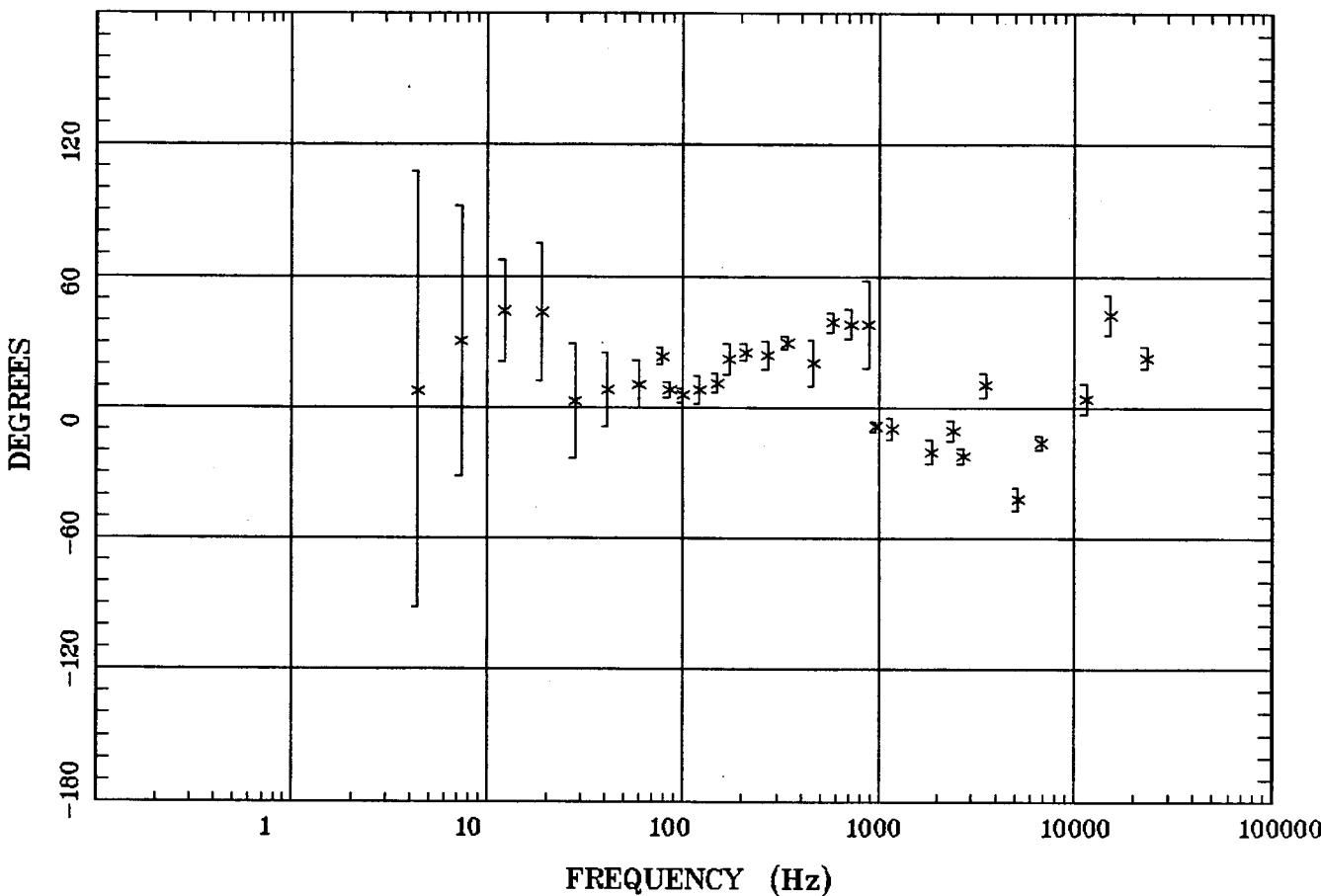
## TIPPER MAGNITUDE

Priority 4



## TIPPER STRIKE

Priority 4

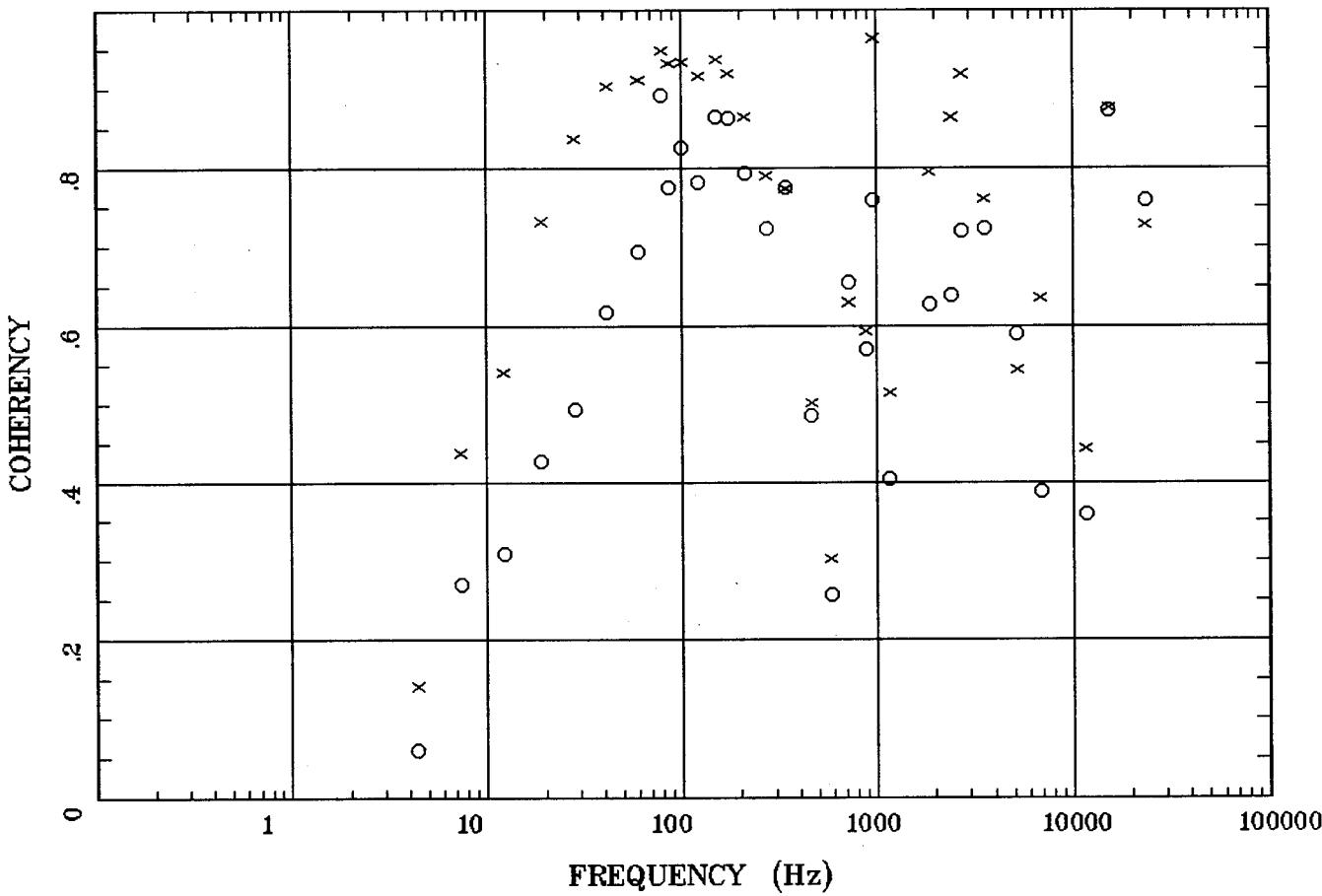


Client: Water Resources  
Remote: none  
Acquired: 13:3 Nov 02, 2003  
Survey Co:USGS

Rotation:  
Filename: nts48.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 11:13 Dec 09, 2004  
< EMI - ElectroMagnetic Instruments >

HzHx.x Coh HzHy.o

Priority 4



Client: Water Resources

Remote: none

Acquired: 13:3 Nov 02, 2003

Survey Co:USGS

Rotation:

Filename: nts48.avg

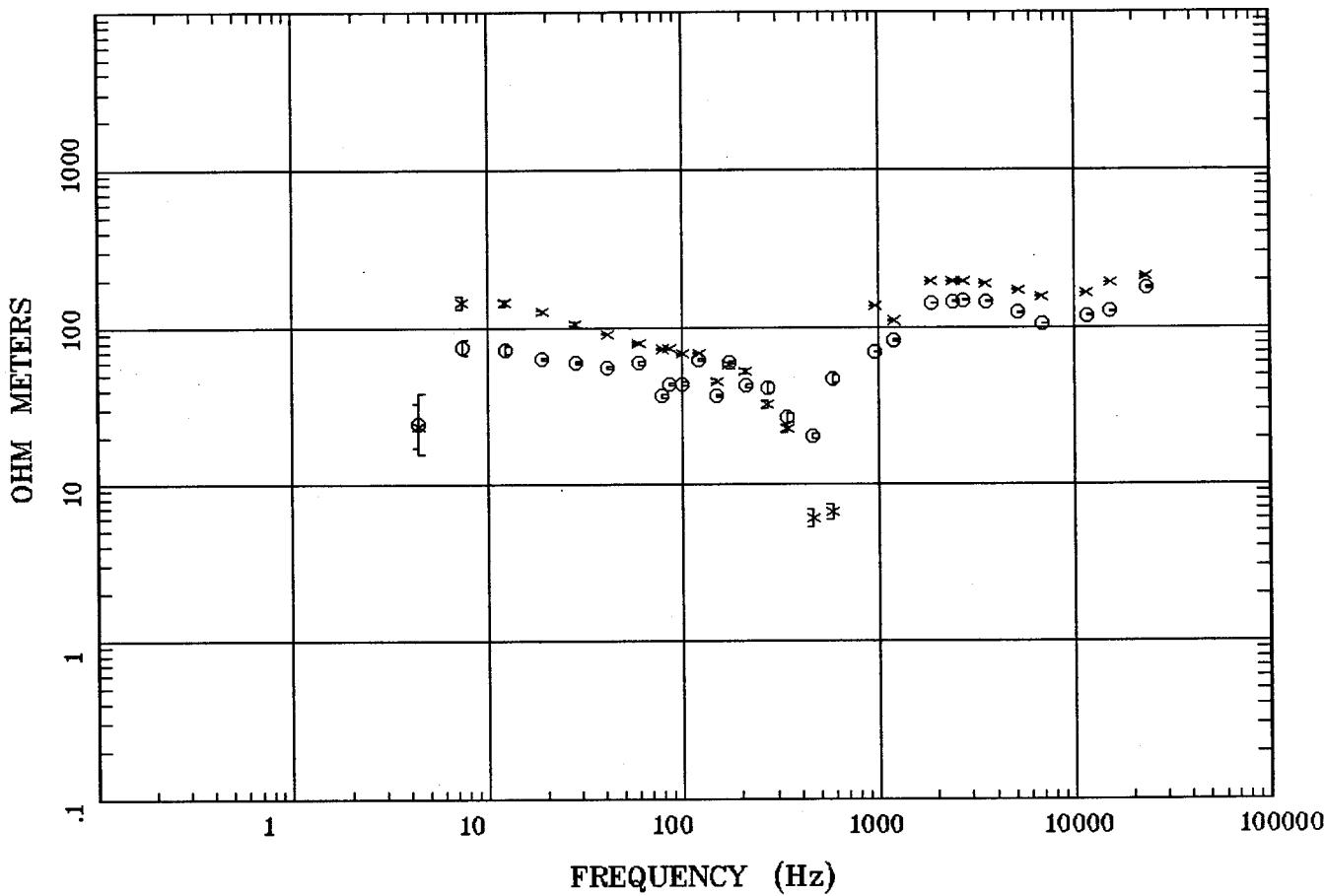
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:13 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## APPARENT RESISTIVITY

Priority 4



Client: Water Resources

Remote: none

Acquired: 15:3 Nov 05, 2003

Survey Co:USGS

Rotation:

Filename: nts49.avg

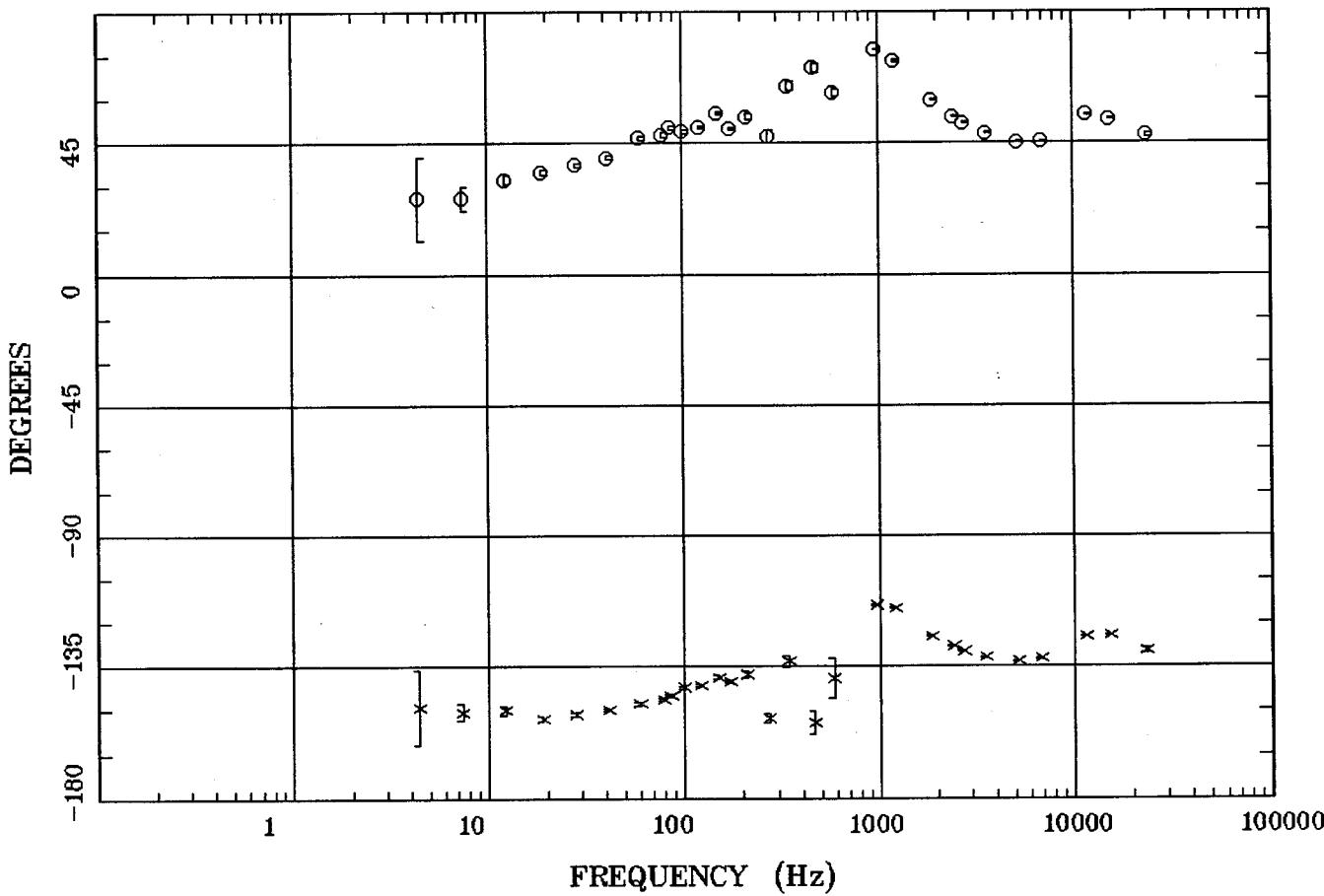
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:14 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## IMPEDANCE PHASE

Priority 4

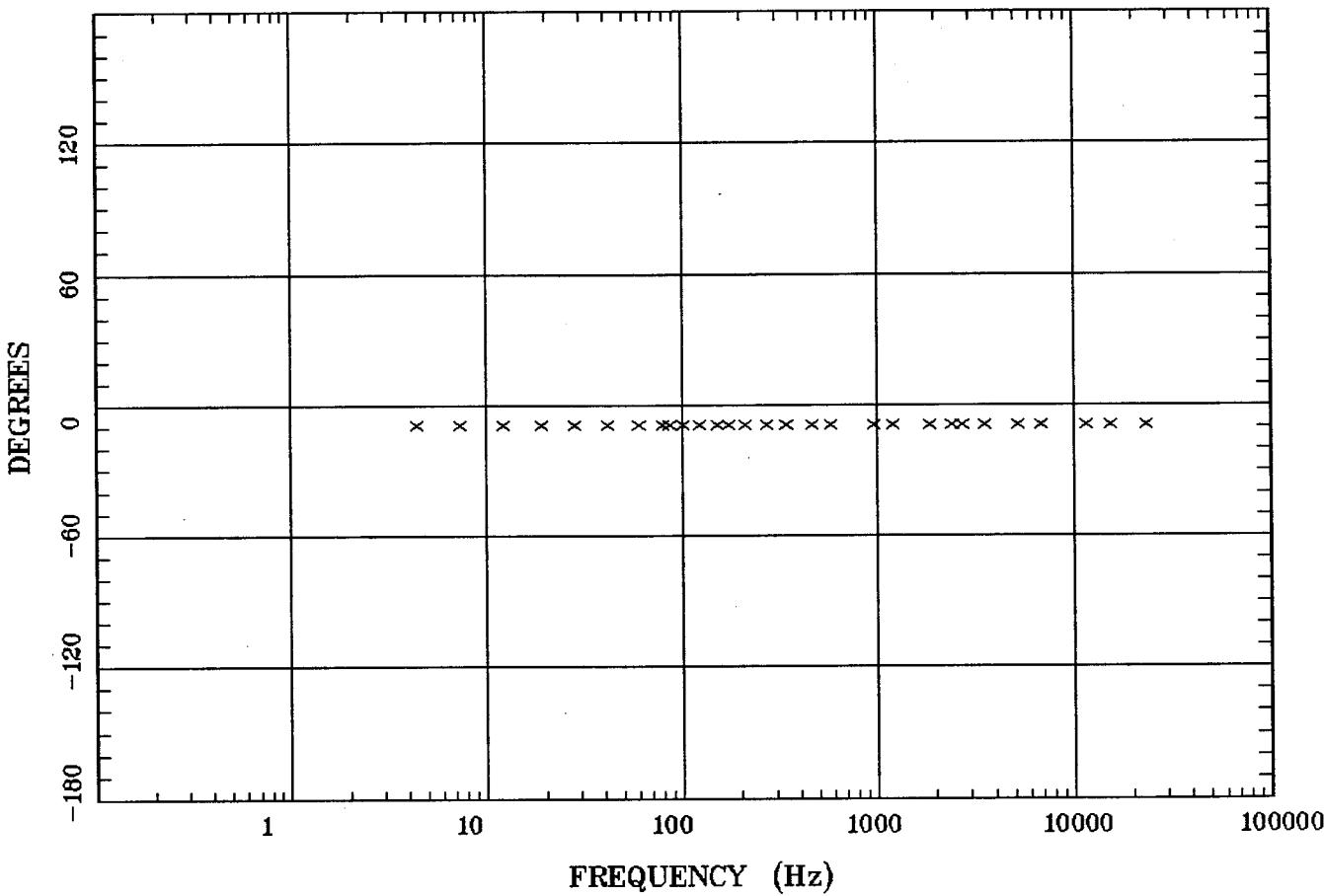


Client: Water Resources  
Remote: none  
Acquired: 15:3 Nov 05, 2003  
Survey Co:USGS

Rotation:  
Filename: nts49.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 11:14 Dec 09, 2004  
< EMI - ElectroMagnetic Instruments >

## ROTATION ANGLE

Priority 4



Client: Water Resources

Remote: none

Acquired: 15:3 Nov 05, 2003

Survey Co:USGS

Rotation:

Filename: nts49.avg

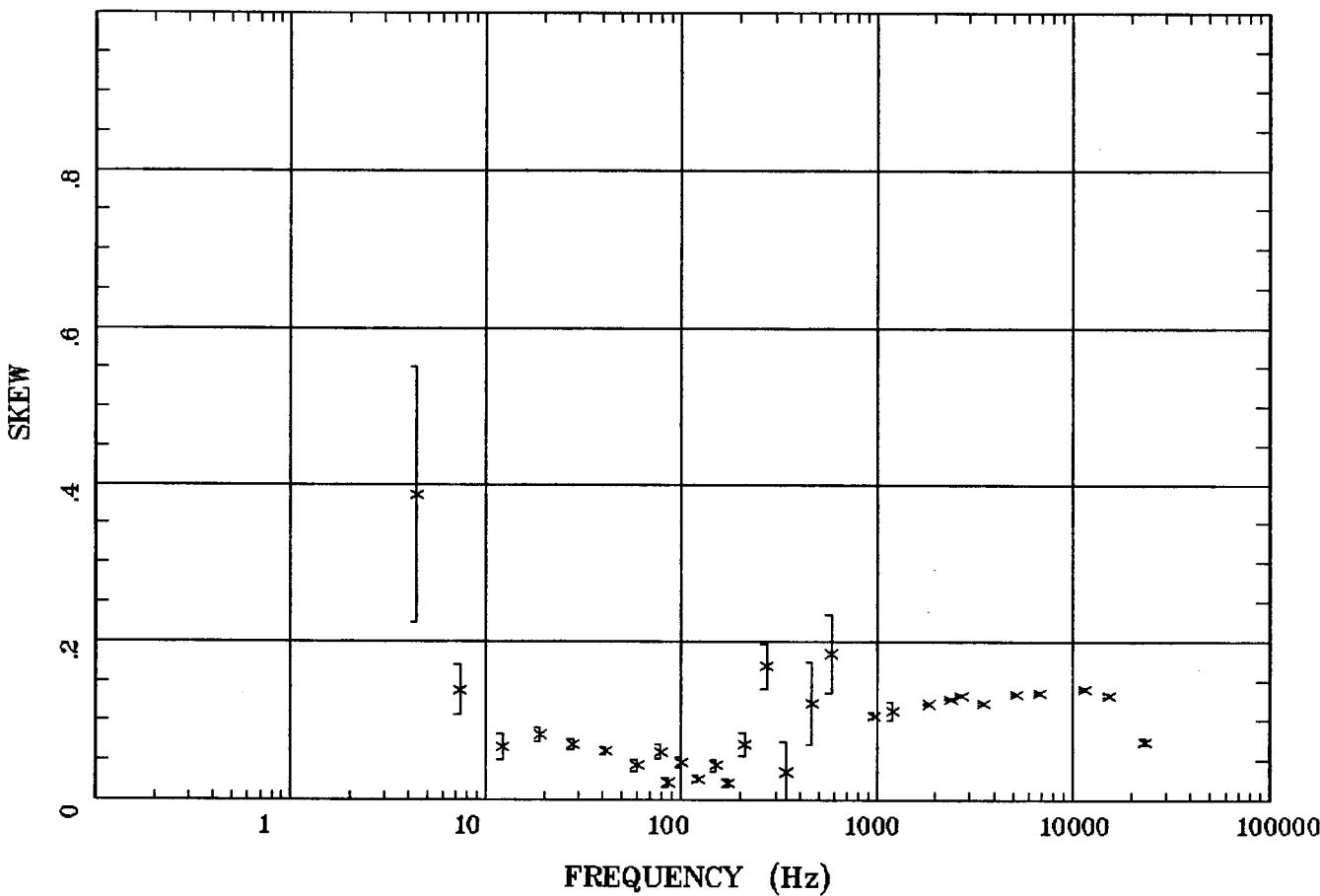
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:14 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## IMPEDANCE SKEW

Priority 4



Client: Water Resources

Remote: none

Acquired: 15:3 Nov 05, 2003

Survey Co:USGS

Rotation:

Filename: nts49.avg

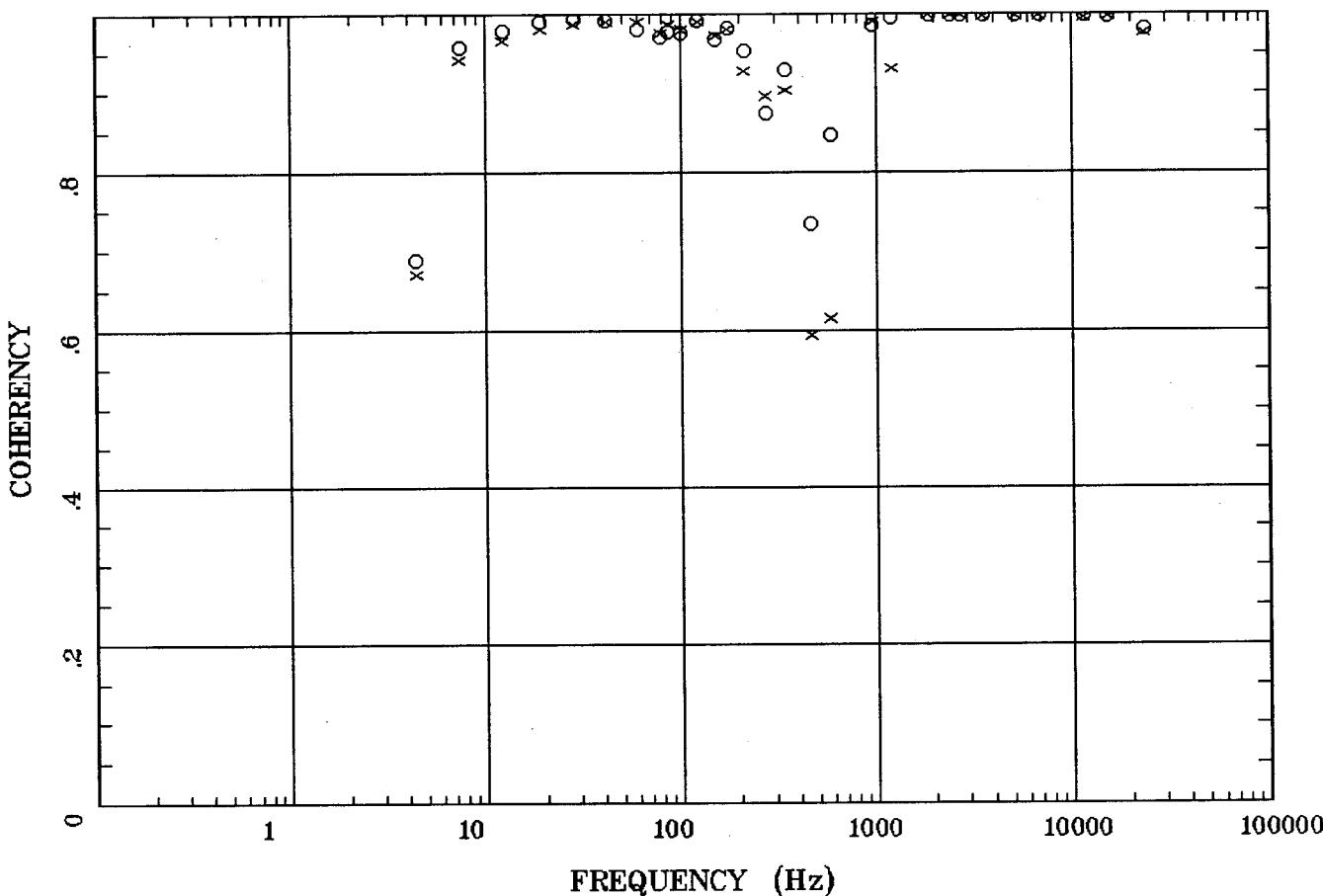
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:14 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

E MULT Coh.

Priority 4



Client: Water Resources

Remote: none

Acquired: 15:3 Nov 05, 2003

Survey Co:USGS

Rotation:

Filename: nts49.avg

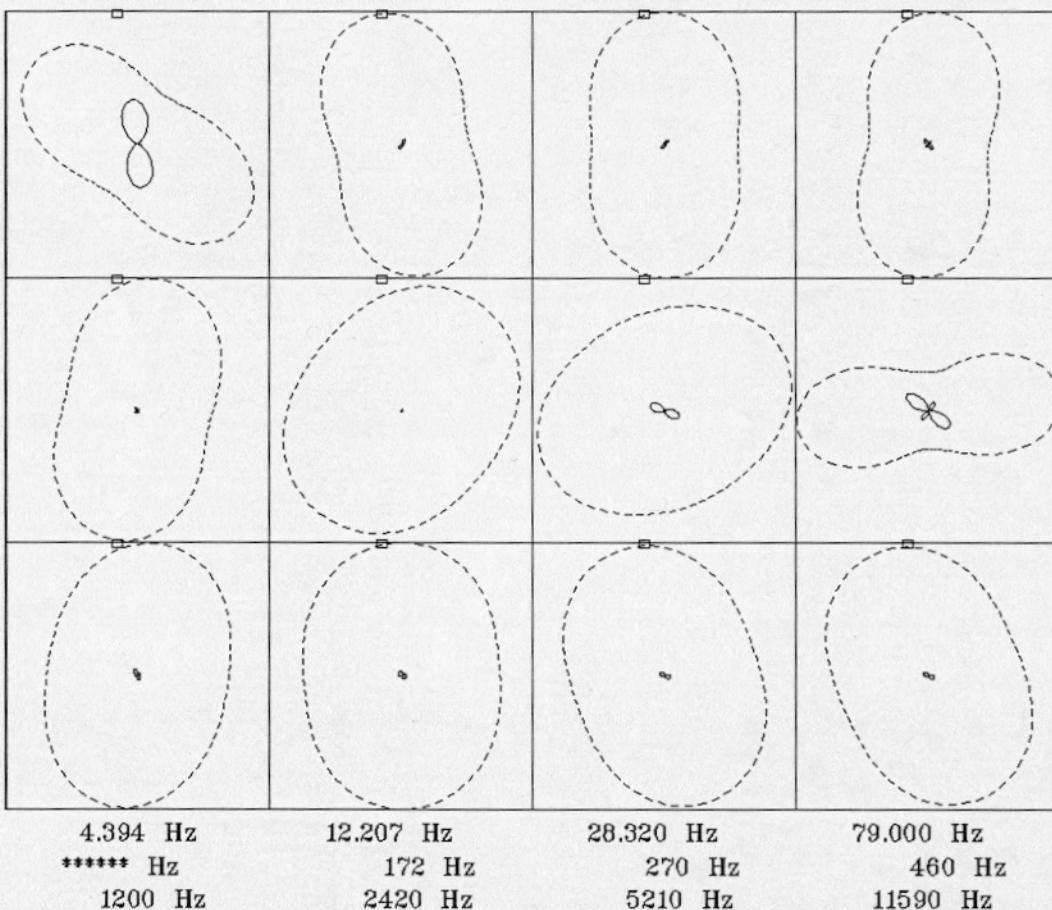
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:14 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## POLAR PLOTS

Priority 4



Client: Water Resources

Remote: none

Acquired: 15:3 Nov 05, 2003

Survey Co:USGS

Rotation:

Filename: nts49.avg

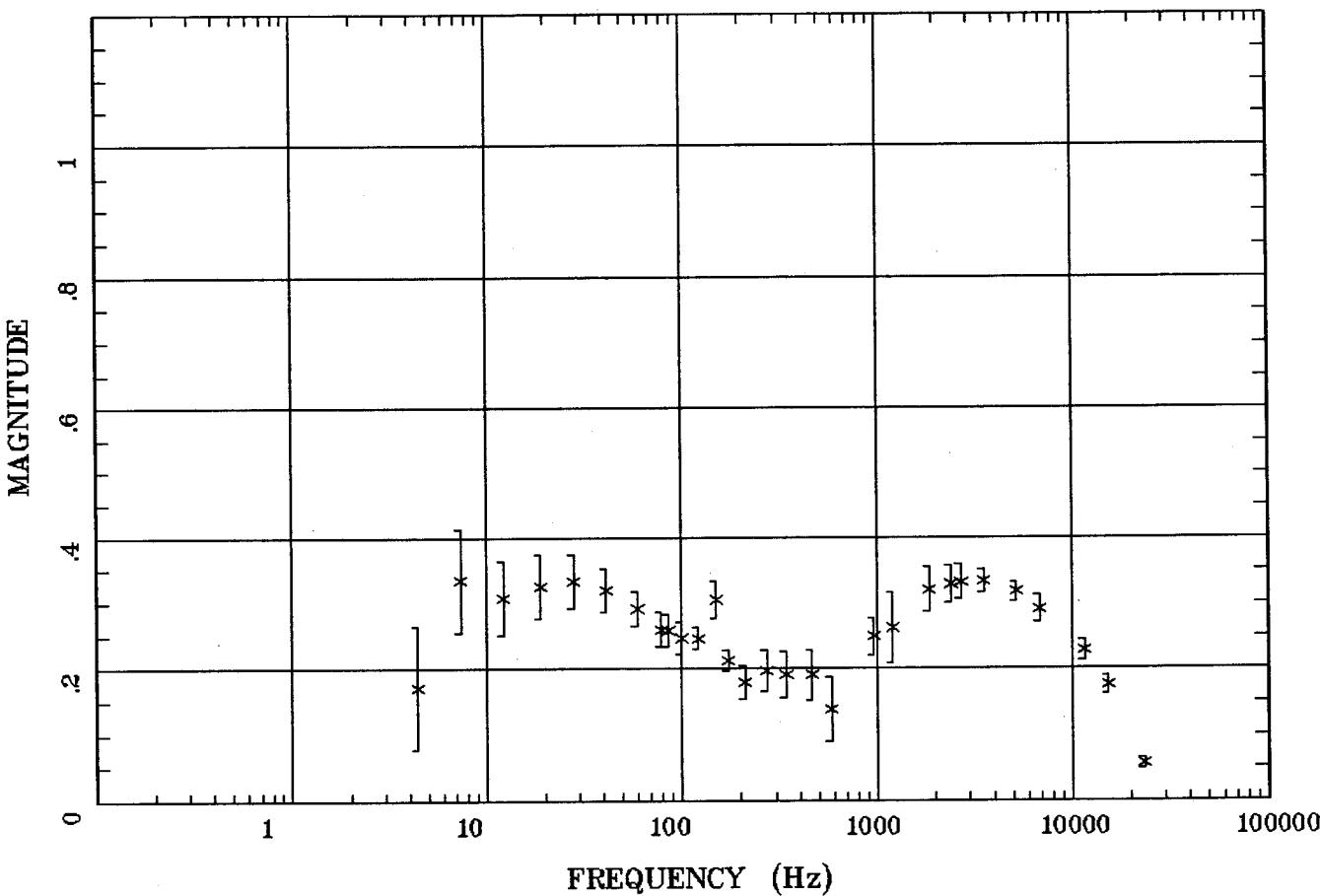
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:14 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## TIPPER MAGNITUDE

Priority 4



Client: Water Resources

Remote: none

Acquired: 15:3 Nov 05, 2003

Survey Co:USGS

Rotation:

Filename: nts49.avg

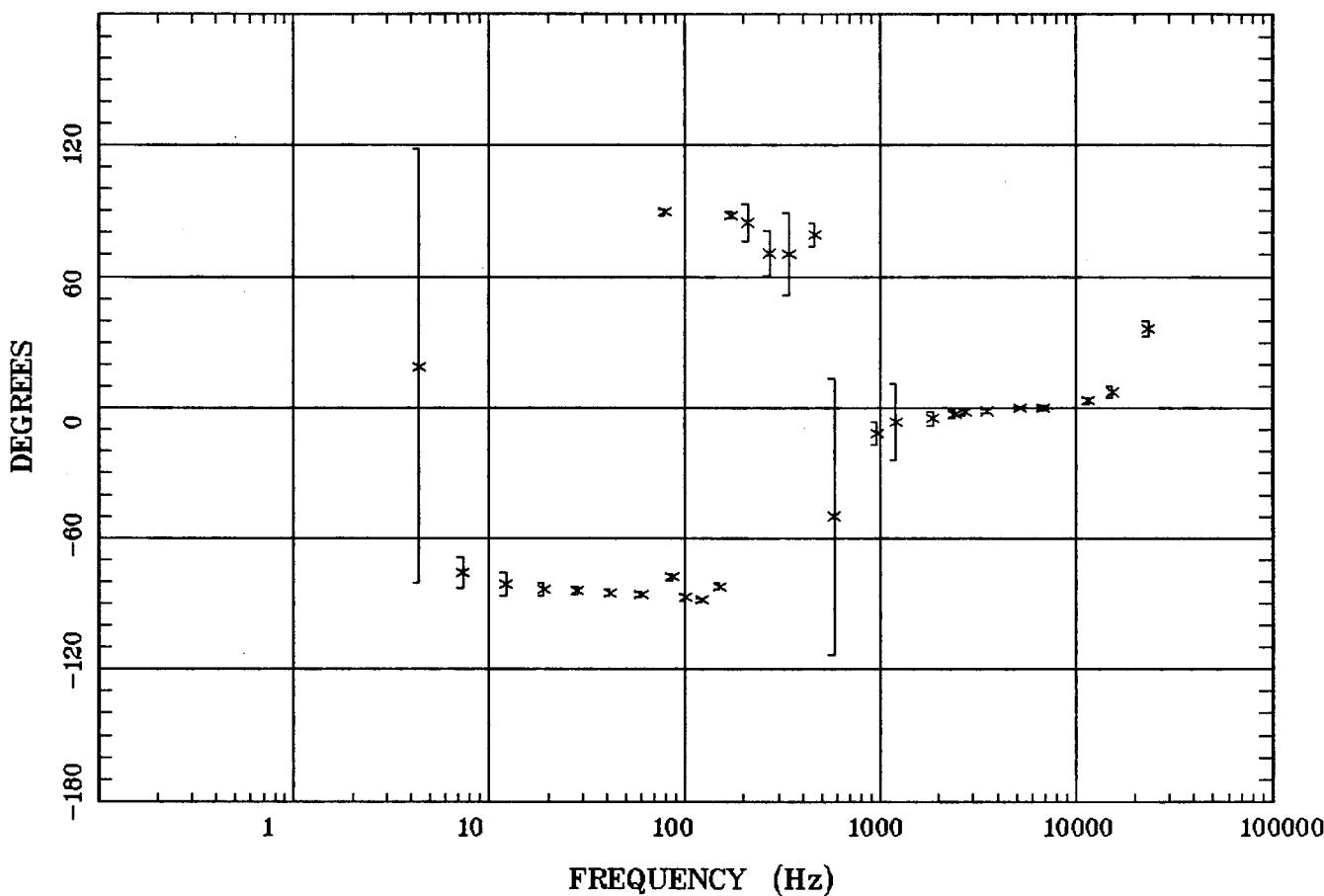
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:14 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

TIPPER STRIKE

Priority 4

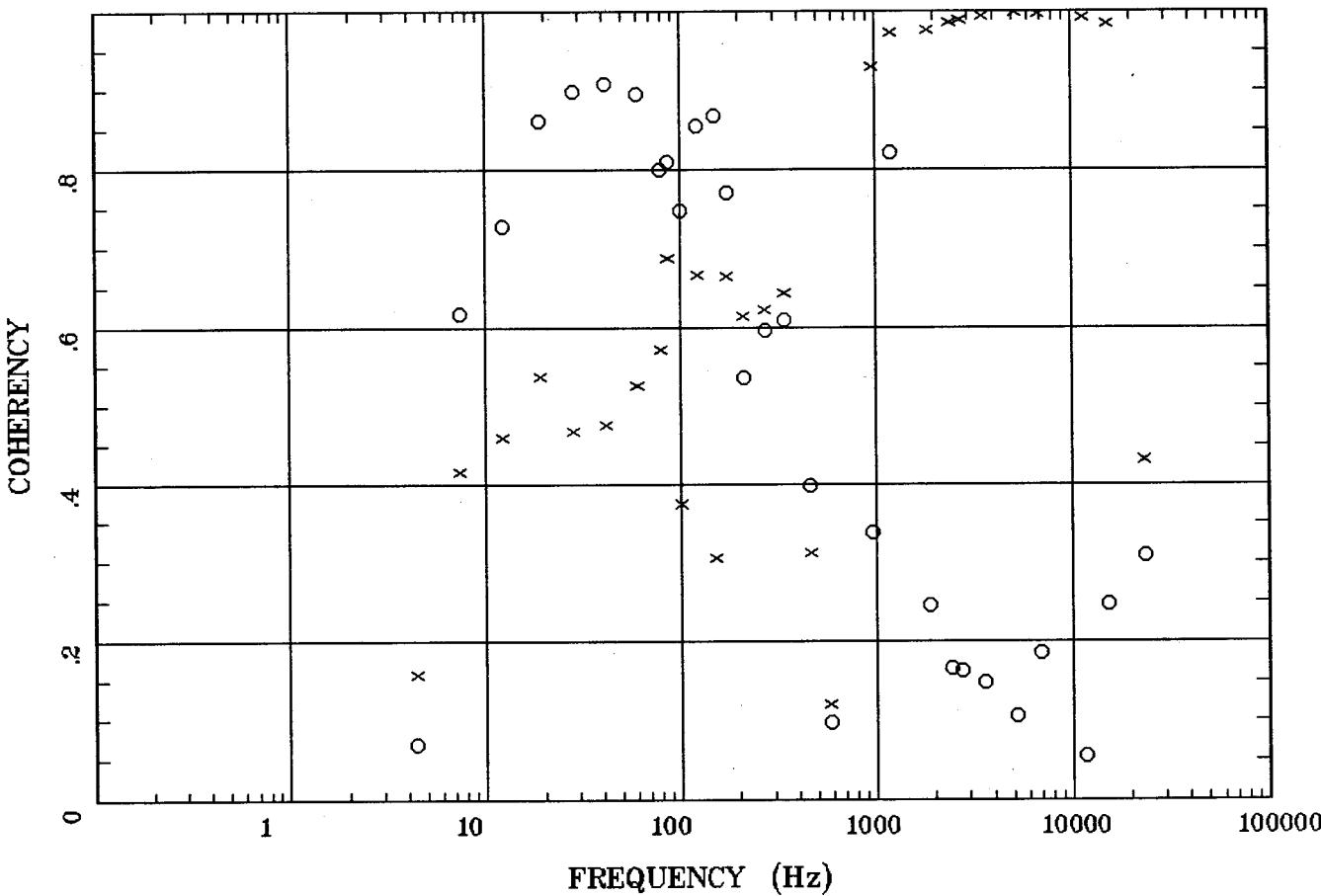


Client: Water Resources  
Remote: none  
Acquired: 15:3 Nov 05, 2003  
Survey Co:USGS

Rotation:  
Filename: nts49.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 11:14 Dec 09, 2004  
< EMI - ElectroMagnetic Instruments >

HzHx.x Coh HzHy.o

Priority 4



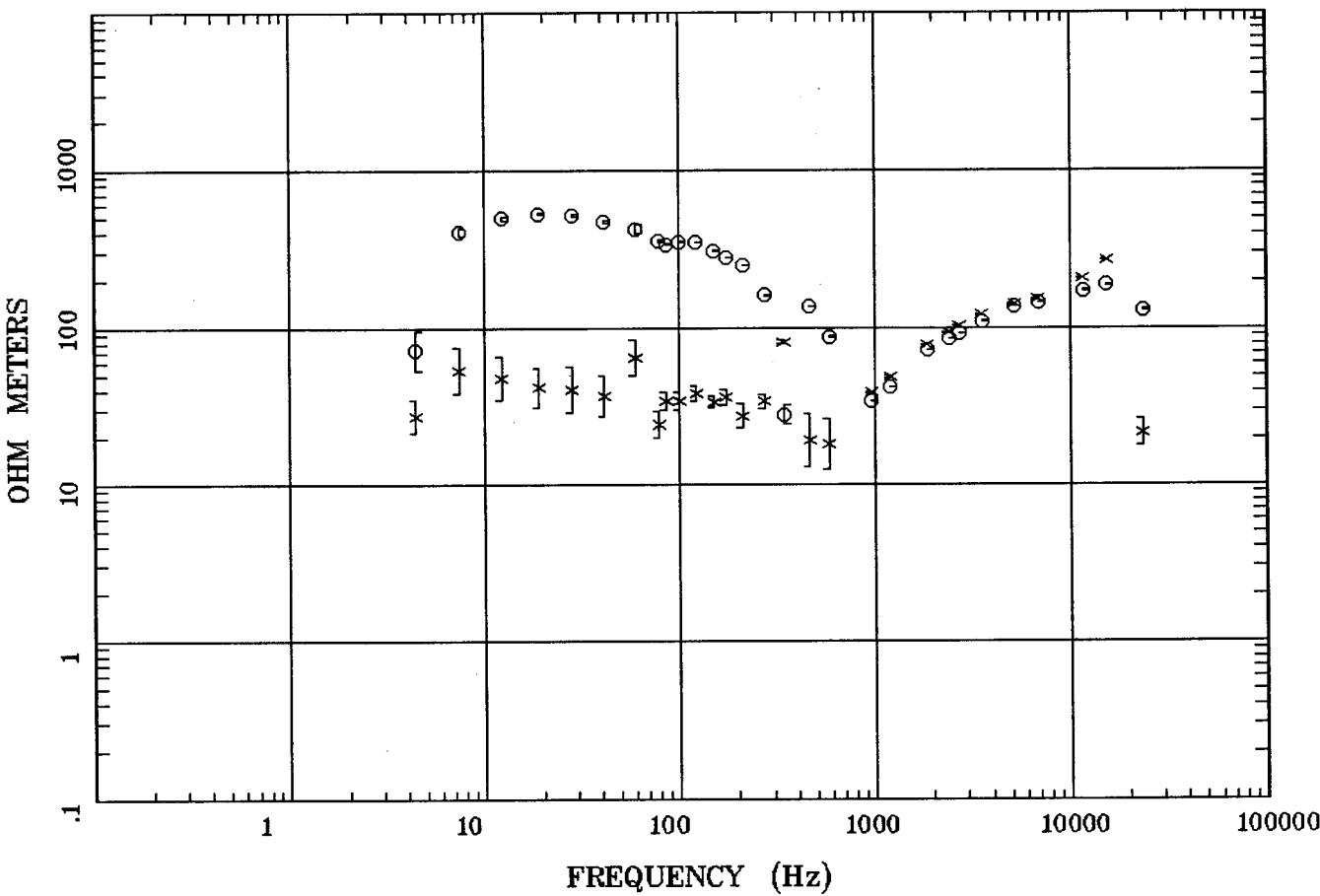
Client: Water Resources  
Remote: none  
Acquired: 15:3 Nov 05, 2003  
Survey Co:USGS

Rotation:  
Filename: nts49.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 11:14 Dec 09, 2004  
< EMI - ElectroMagnetic Instruments >

## APPARENT RESISTIVITY

Priority 4

Station 50

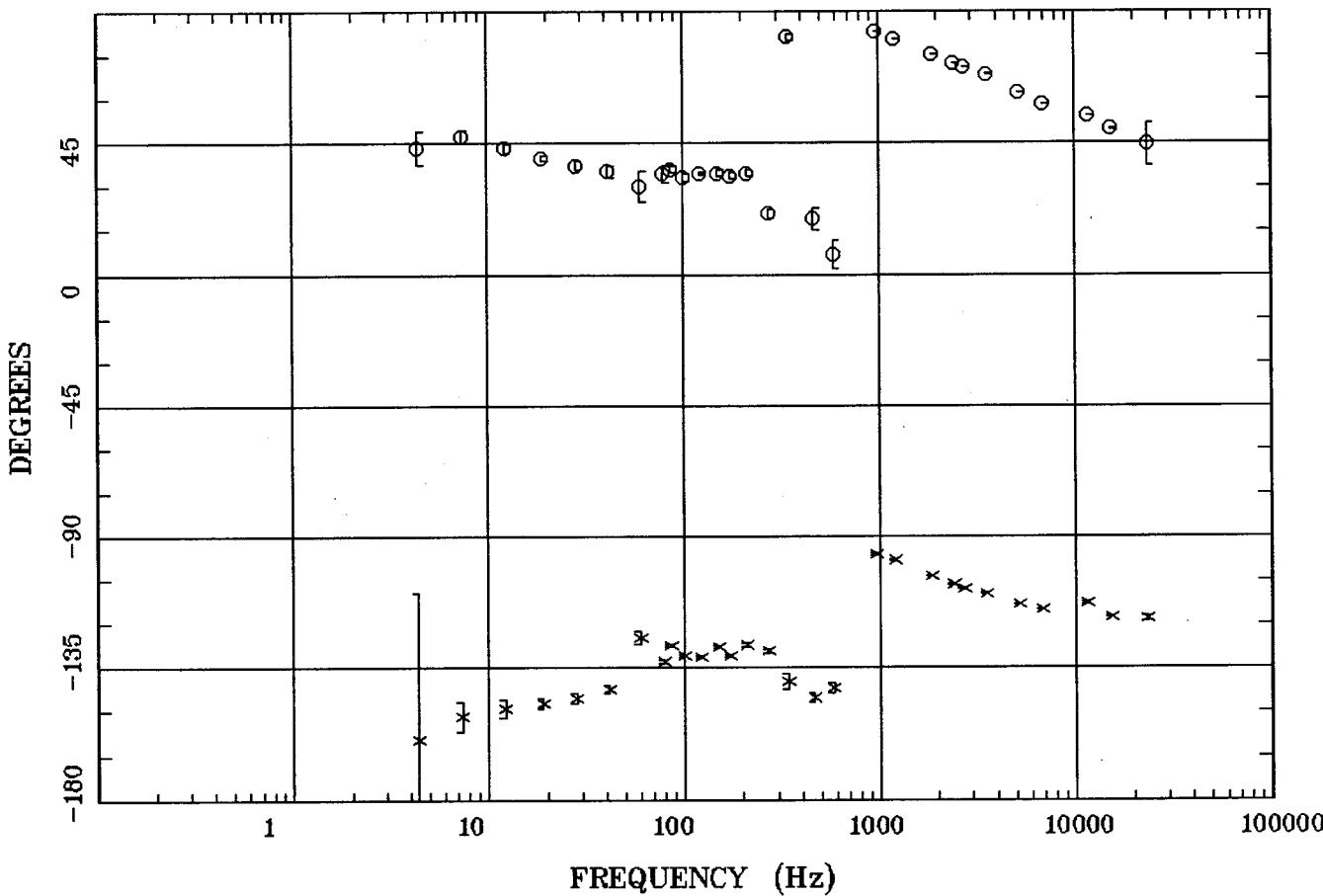


Client: Water Resources  
Remote: none  
Acquired: 12:2 Nov 05, 2003  
Survey Co:USGS

Rotation:  
Filename: nts50.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 11:15 Dec 09, 2004  
< EMI - ElectroMagnetic Instruments >

## IMPEDANCE PHASE

Priority 4

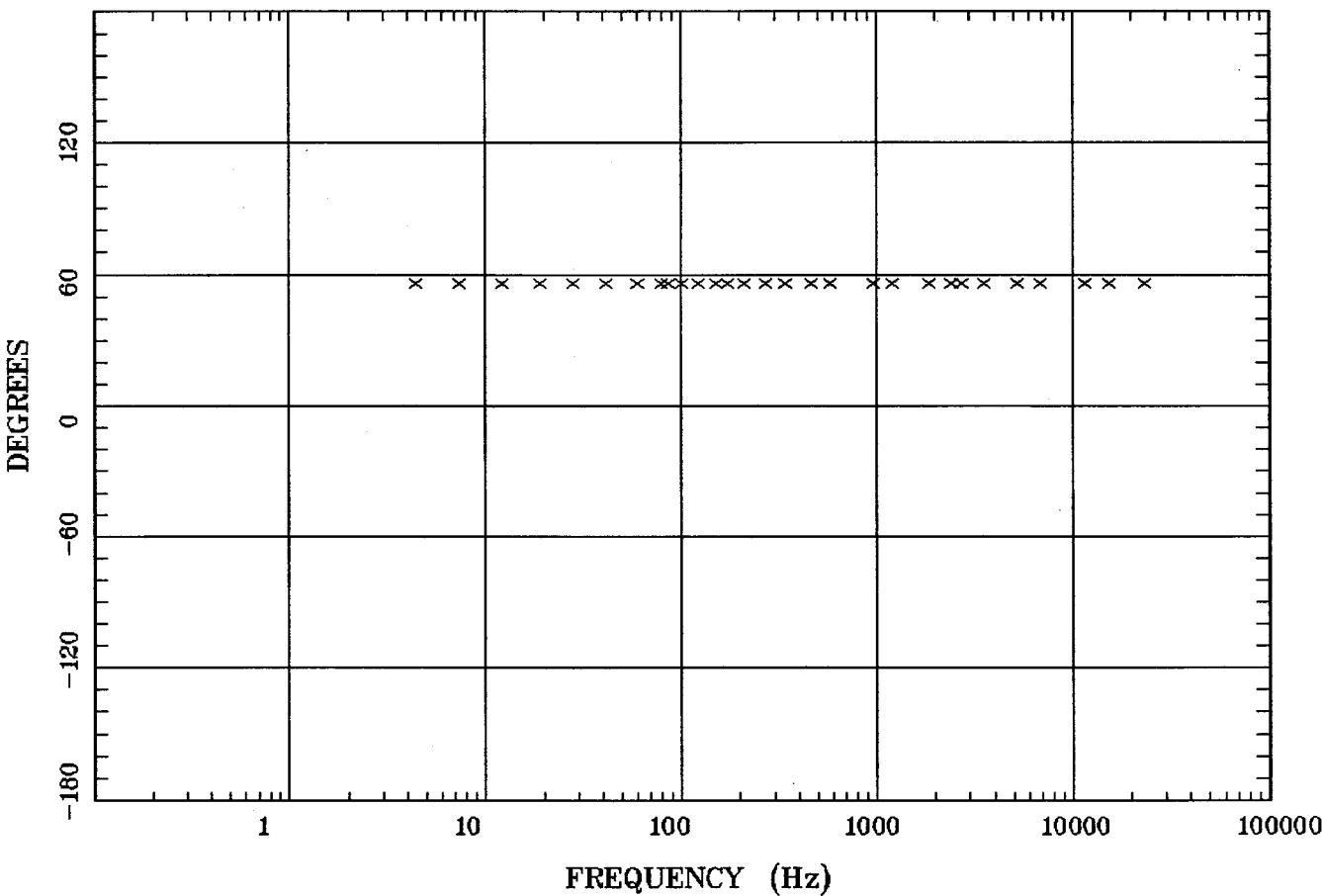


Client: Water Resources  
Remote: none  
Acquired: 12:2 Nov 05, 2003  
Survey Co:USGS

Rotation:  
Filename: nts50.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 11:15 Dec 09, 2004  
< EMI - ElectroMagnetic Instruments >

ROTATION ANGLE

Priority 4

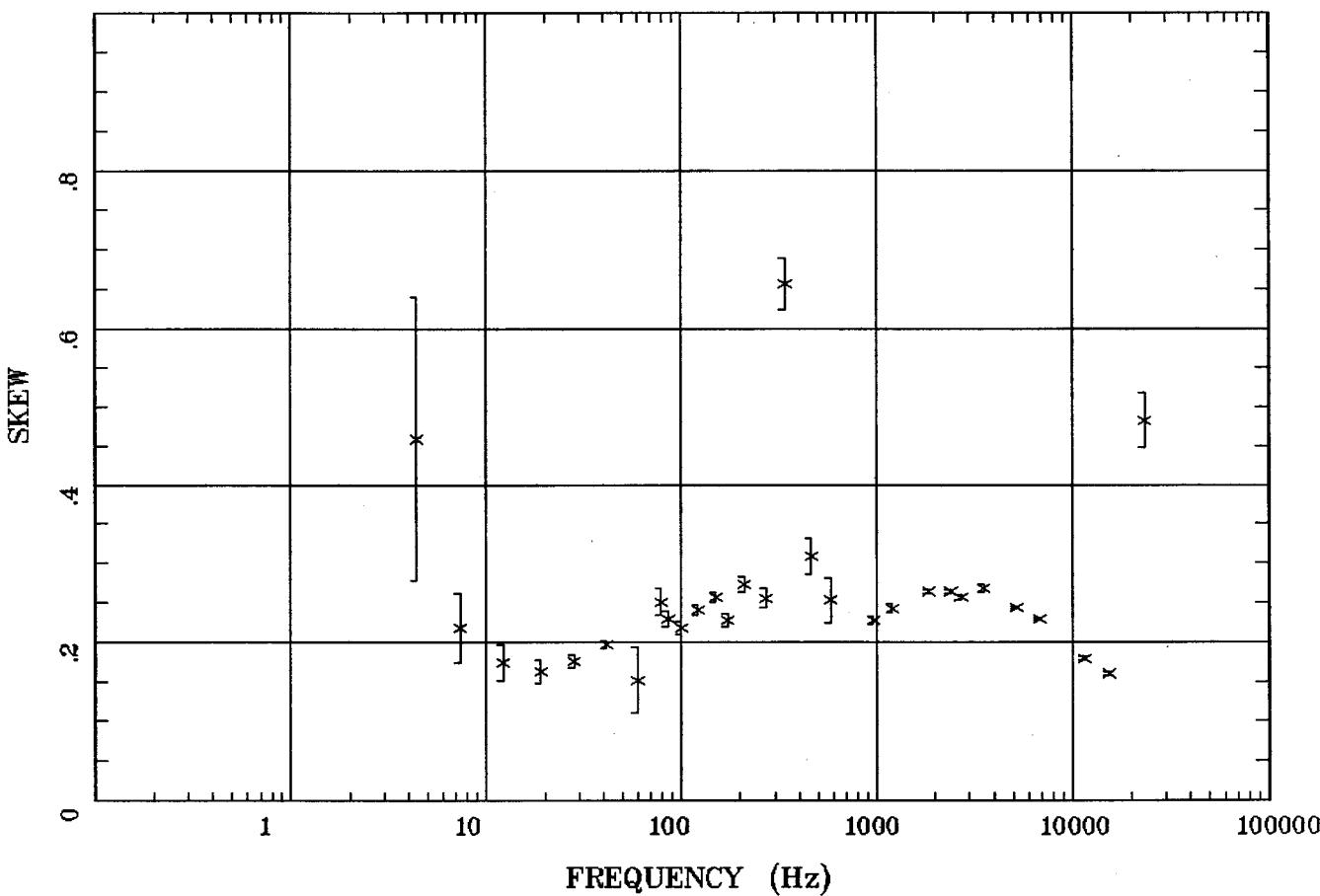


Client: Water Resources  
Remote: none  
Acquired: 12:2 Nov 05, 2003  
Survey Co:USGS

Rotation:  
Filename: nts50.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 11:15 Dec 09, 2004  
< EMI - ElectroMagnetic Instruments >

## IMPEDANCE SKEW

Priority 4



Client: Water Resources

Remote: none

Acquired: 12:2 Nov 05, 2003

Survey Co:USGS

Rotation:

Filename: nts50.avg

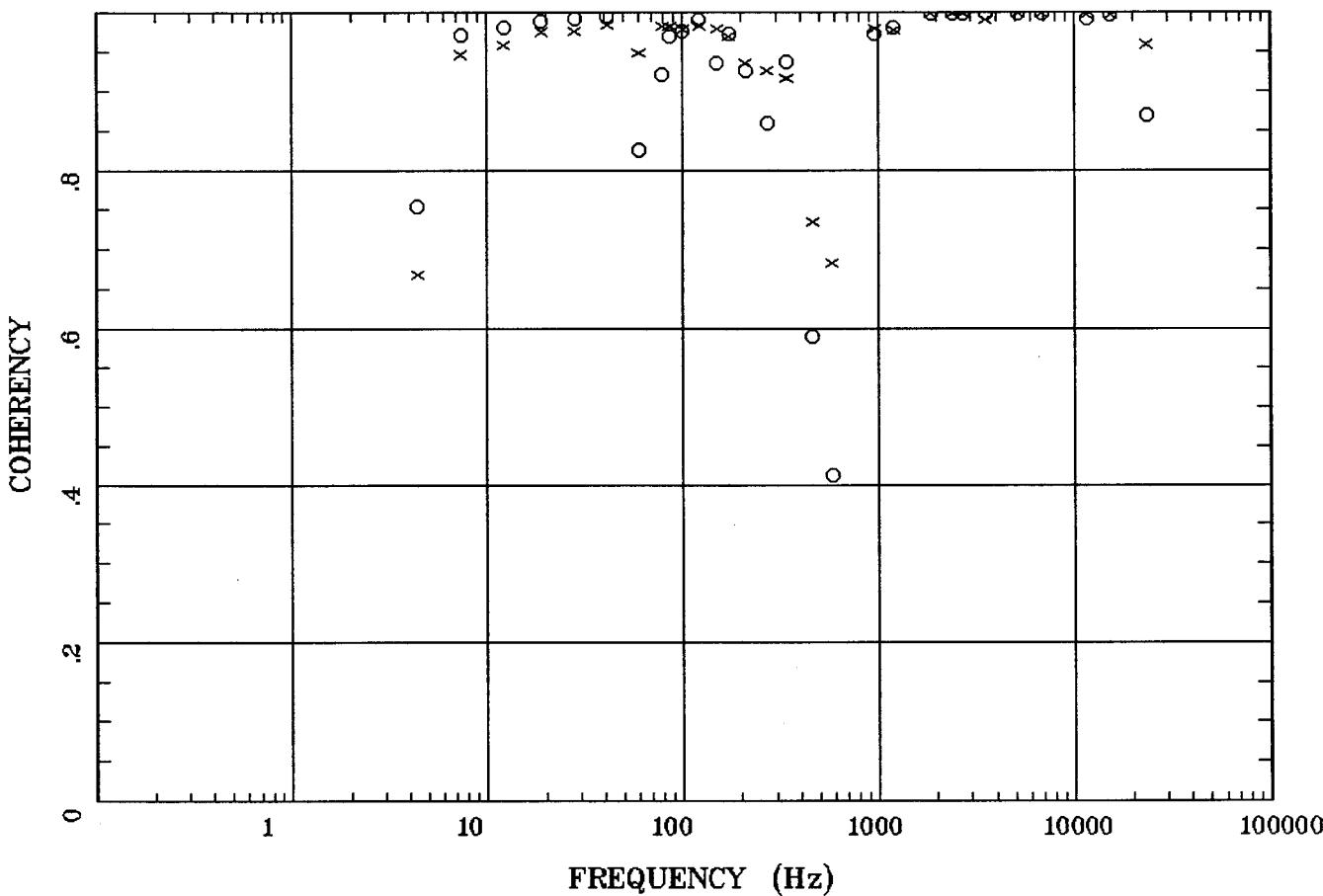
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:15 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

E MULT Coh.

Priority 4



Client: Water Resources

Remote: none

Acquired: 12:2 Nov 05, 2003

Survey Co:USGS

Rotation:

Filename: nts50.avg

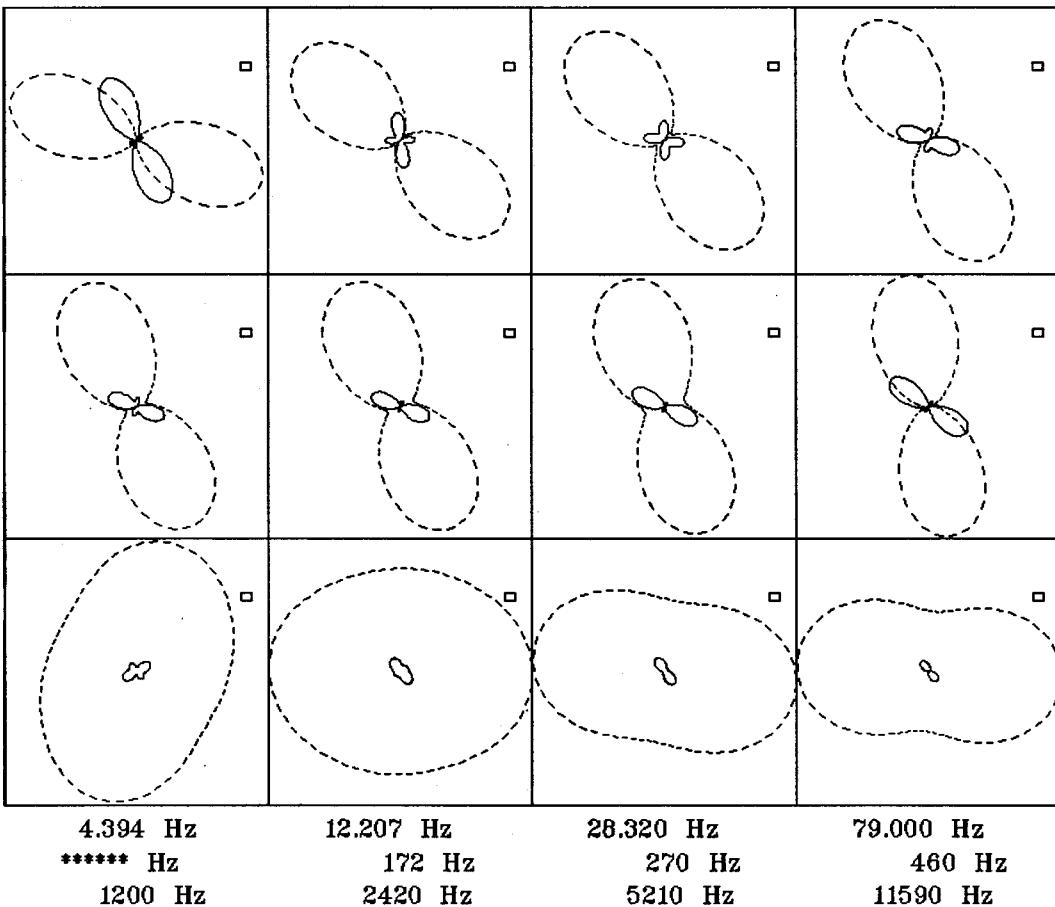
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:15 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## POLAR PLOTS

Priority 4



Client: Water Resources

Remote: none

Acquired: 12:2 Nov 05, 2003

Survey Co:USGS

Rotation:

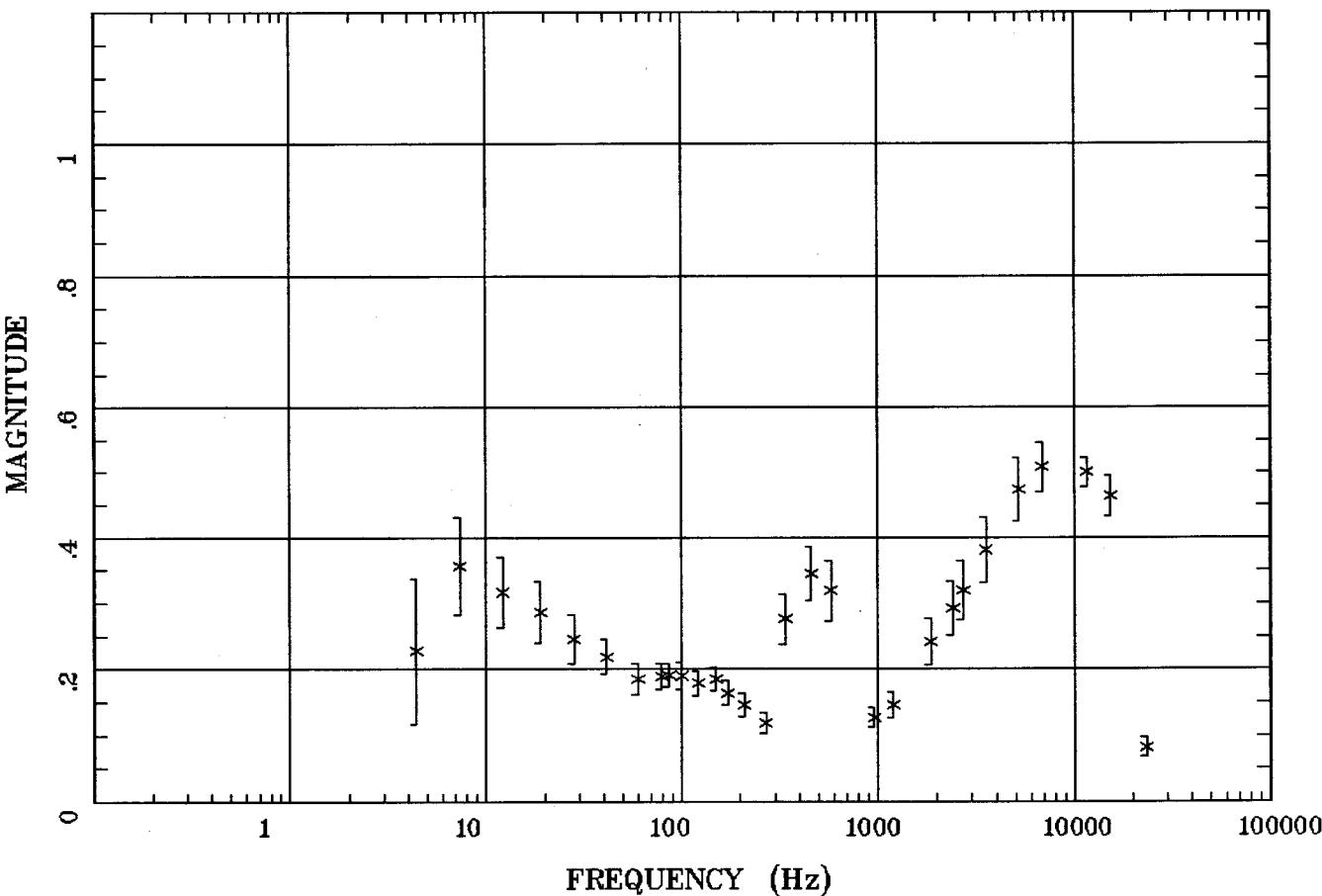
Filename: nts50.avg

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:15 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## TIPPER MAGNITUDE



Client: Water Resources

Remote: none

Acquired: 12:2 Nov 05, 2003

Survey Co:USGS

Rotation:

Filename: nts50.avg

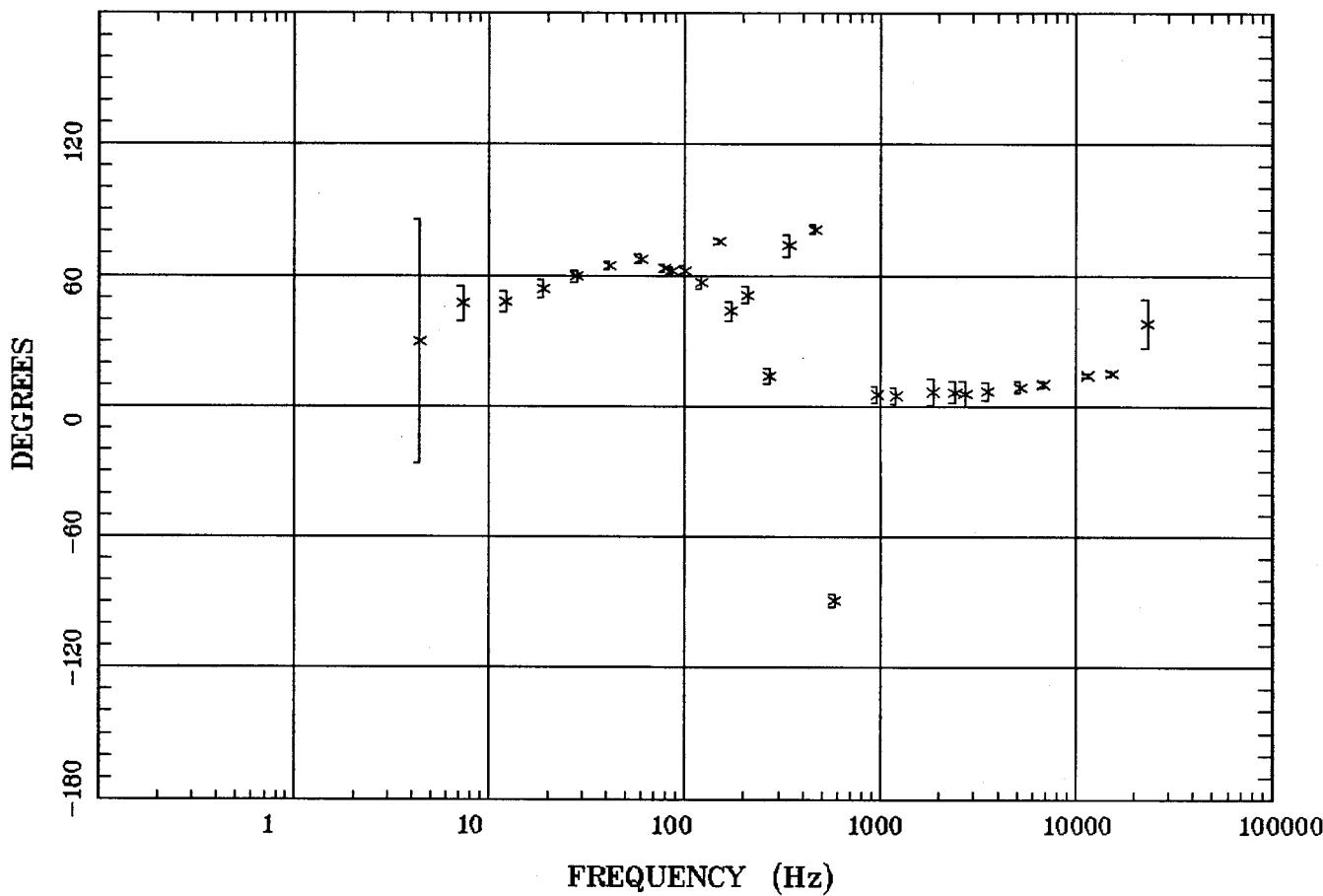
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:15 Dec 09, 2004

< EMI - ElectroMagnetic Instruments >

TIPPER STRIKE

Priority 4



Client: Water Resources

Remote: none

Acquired: 12:2 Nov 05, 2003

Survey Co:USGS

Rotation:

Filename: nts50.avg

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

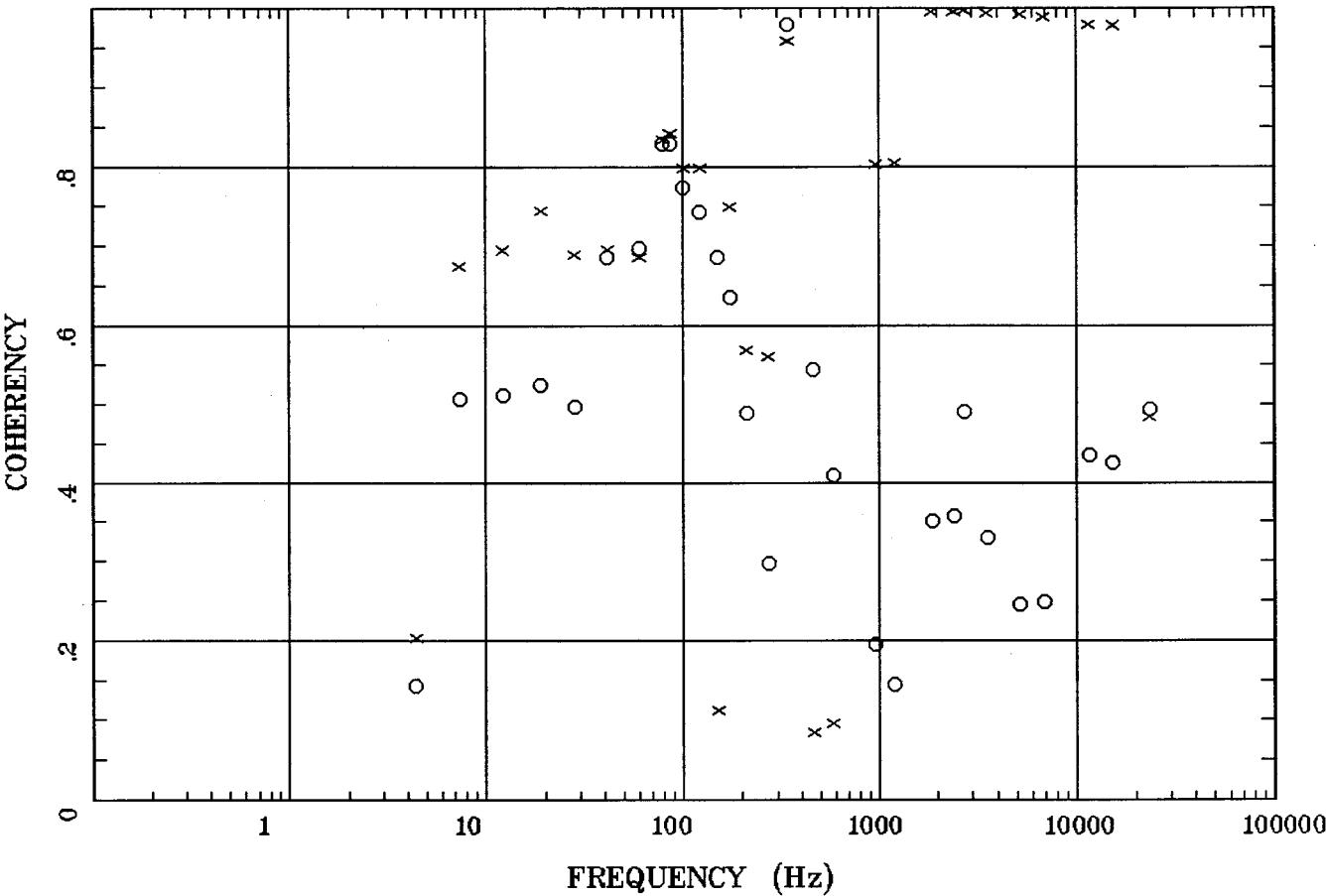
Plotted: 11:15 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

HzHx.x Coh HzHy.o

Priority 4

Station 50

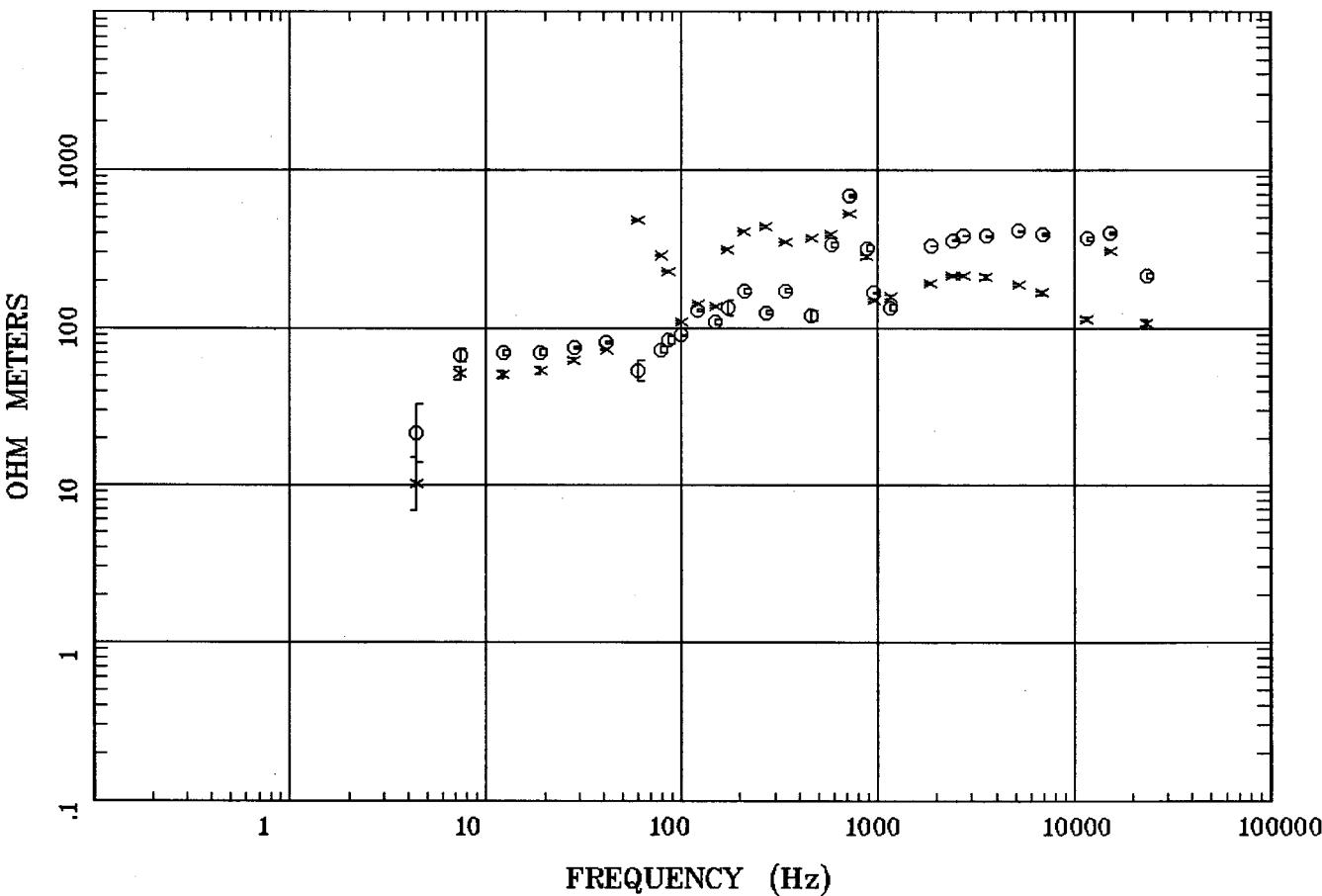


Client: Water Resources  
Remote: none  
Acquired: 12:2 Nov 05, 2003  
Survey Co:USGS

Rotation:  
Filename: nts50.avg  
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4  
Plotted: 11:15 Dec 09, 2004  
< EMI - ElectroMagnetic Instruments >

## APPARENT RESISTIVITY

Priority 4



Client: Water Resources

Remote: none

Acquired: 14:4 Nov 08, 2003

Survey Co:USGS

Rotation:

Filename: nts51.avg

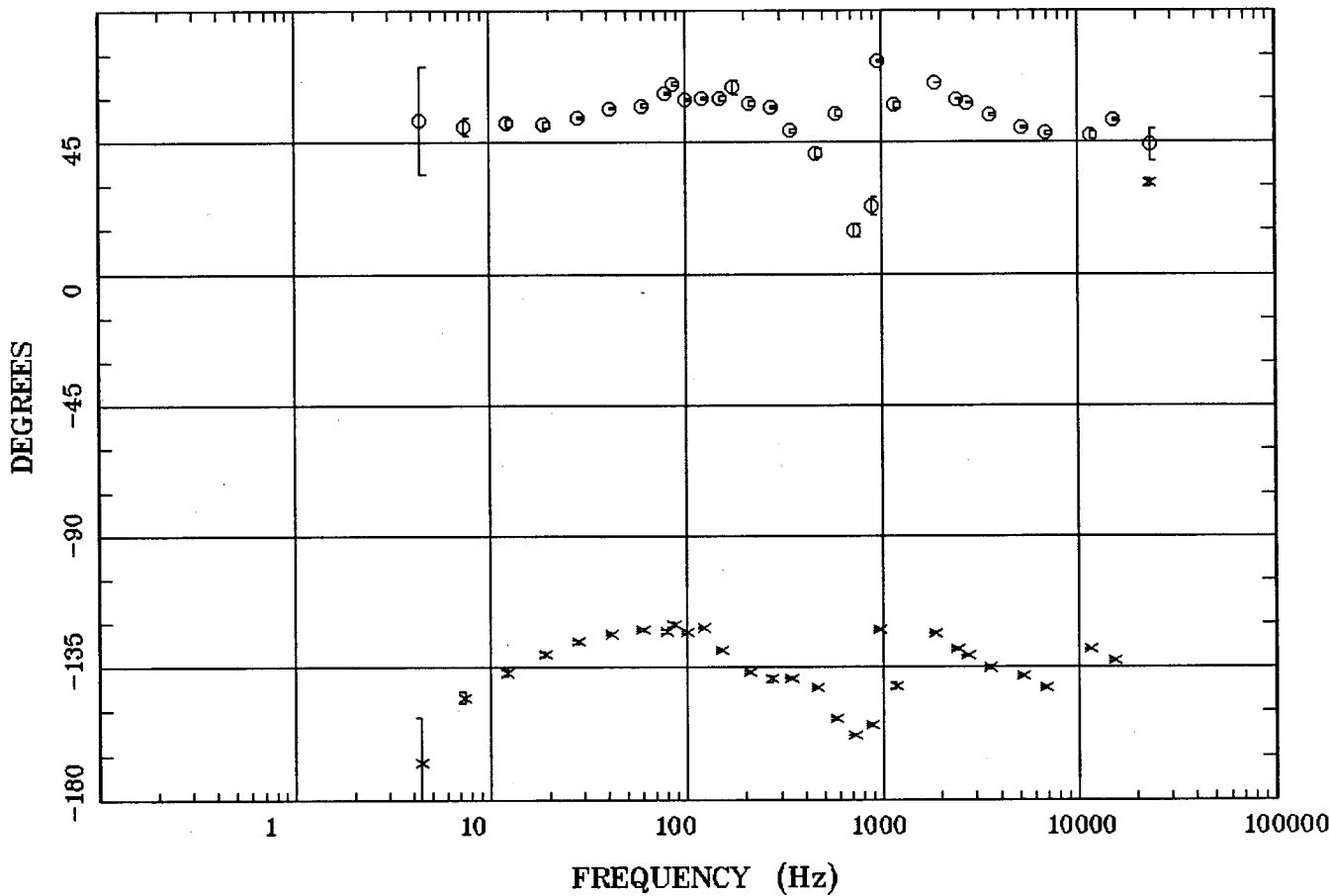
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:15 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## IMPEDANCE PHASE

Priority 4



Client: Water Resources

Remote: none

Acquired: 14:4 Nov 08, 2003

Survey Co:USGS

Rotation:

Filename: nts51.avg

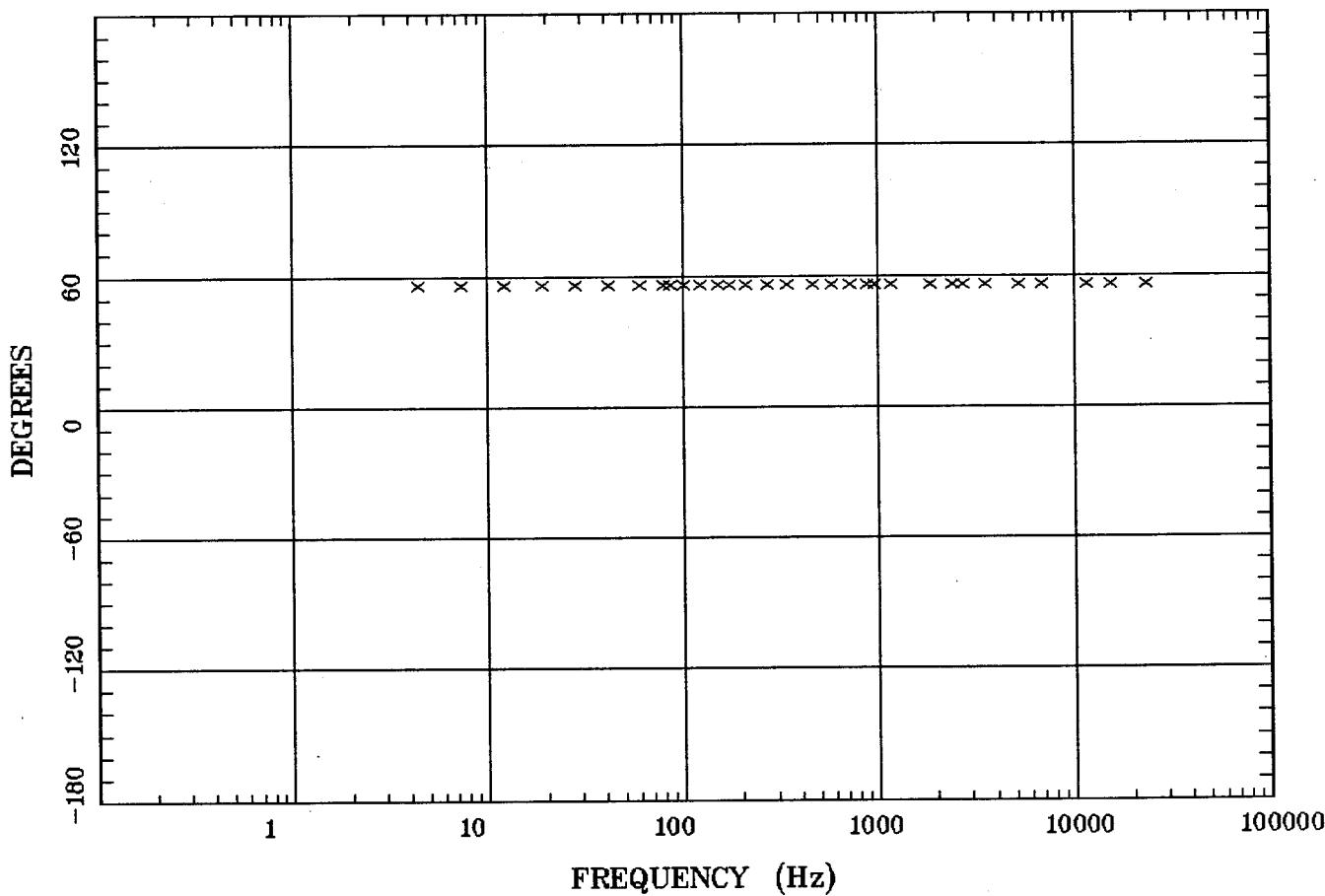
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:15 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## ROTATION ANGLE

Priority 4



Client: Water Resources

Remote: none

Acquired: 14:4 Nov 08, 2003

Survey Co:USGS

Rotation:

Filename: nts51.avg

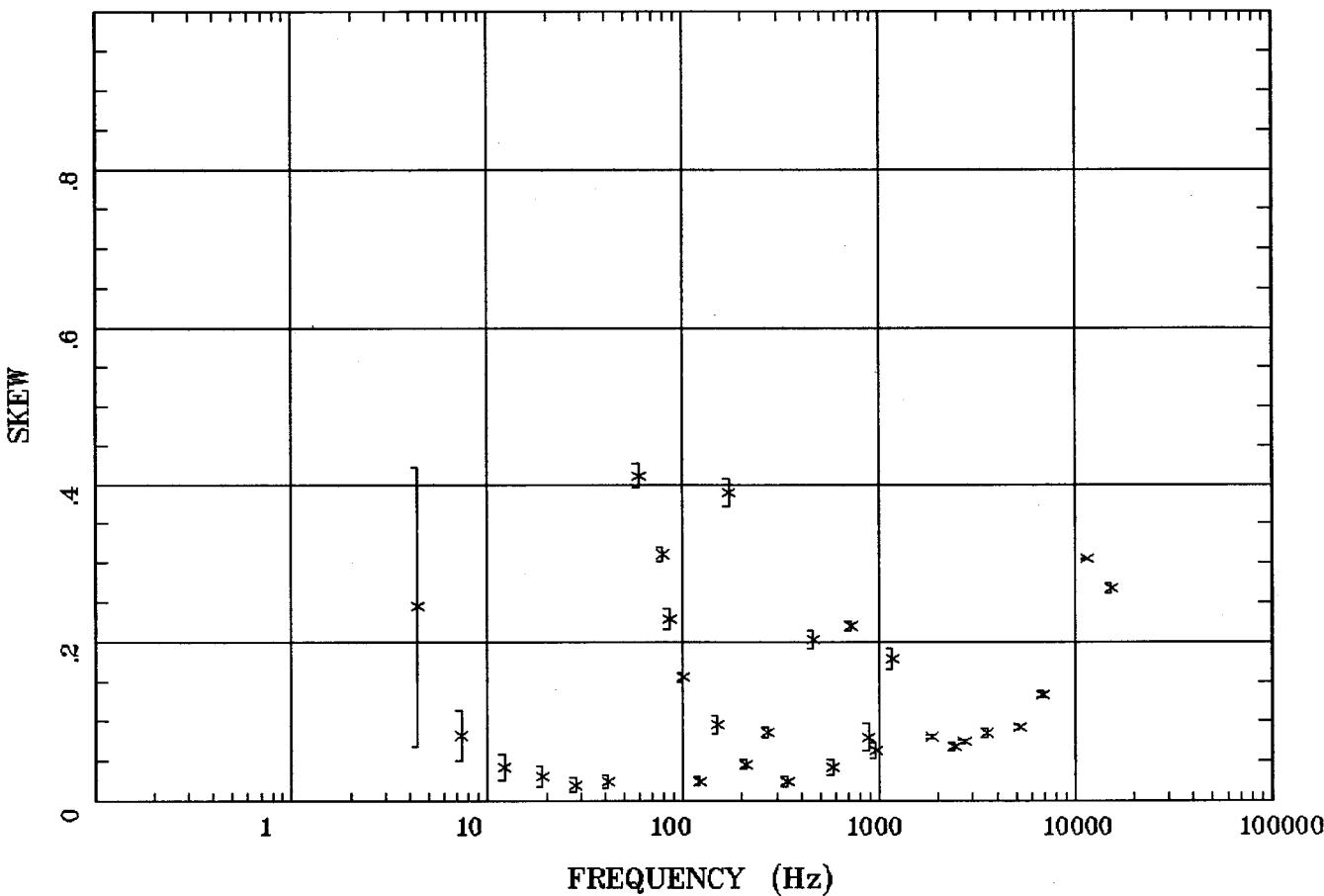
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:15 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## IMPEDANCE SKEW

Priority 4



Client: Water Resources

Remote: none

Acquired: 14:4 Nov 08, 2003

Survey Co:USGS

Rotation:

Filename: nts51.avg

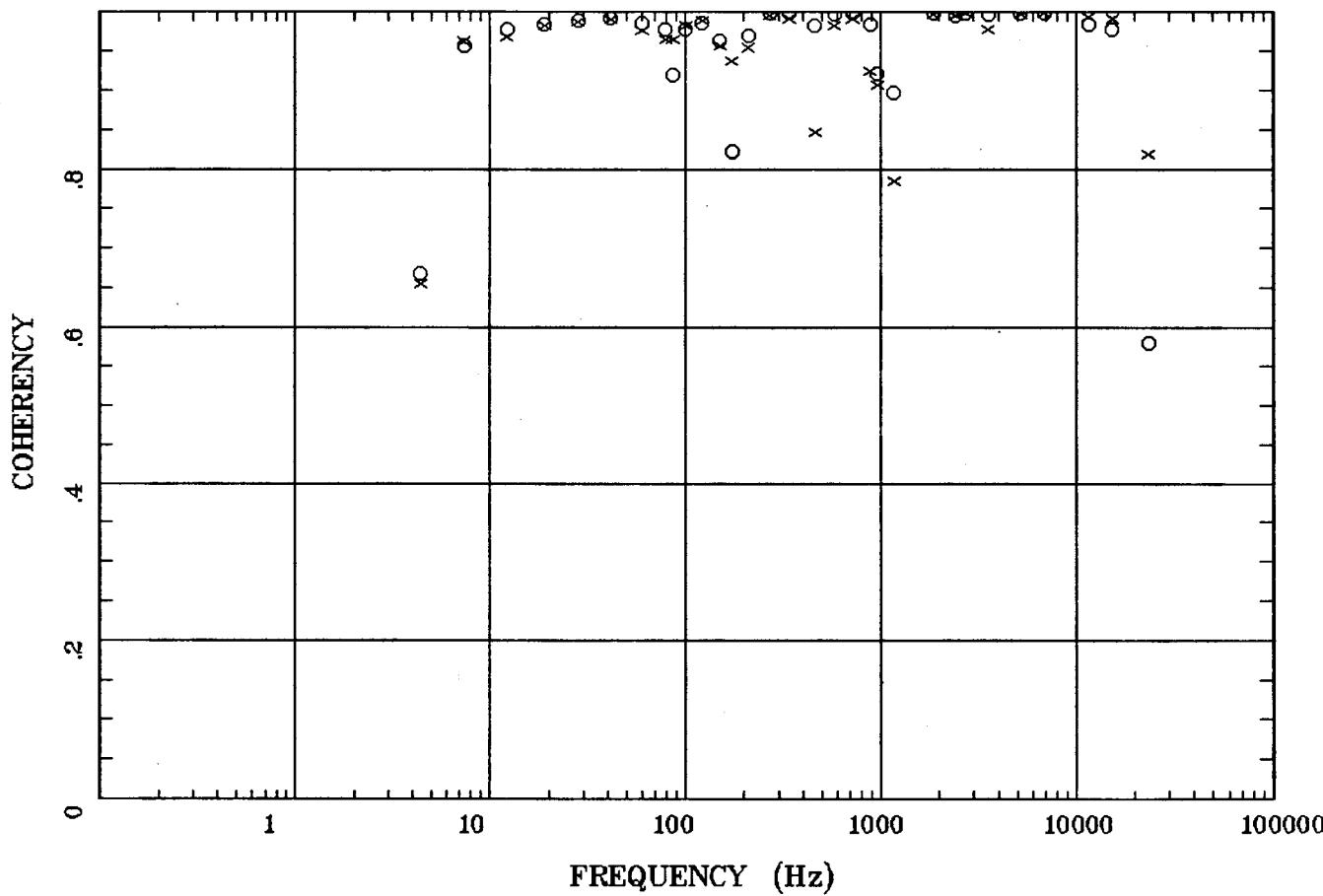
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:15 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

E MULT Coh.

Priority 4



Client: Water Resources

Remote: none

Acquired: 14:4 Nov 08, 2003

Survey Co:USGS

Rotation:

Filename: nts51.avg

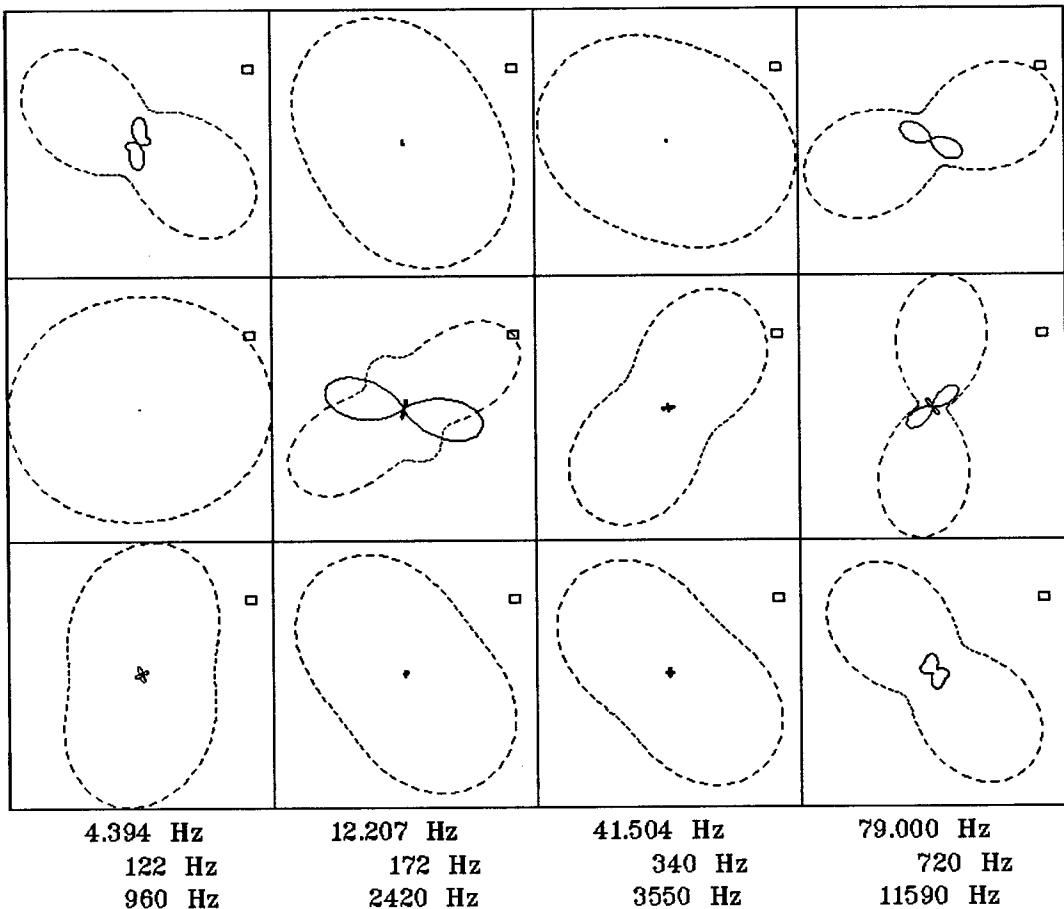
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:15 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## POLAR PLOTS

Priority 4



Rotation:

Filename: nts51.avg

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:15 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

Client: Water Resources

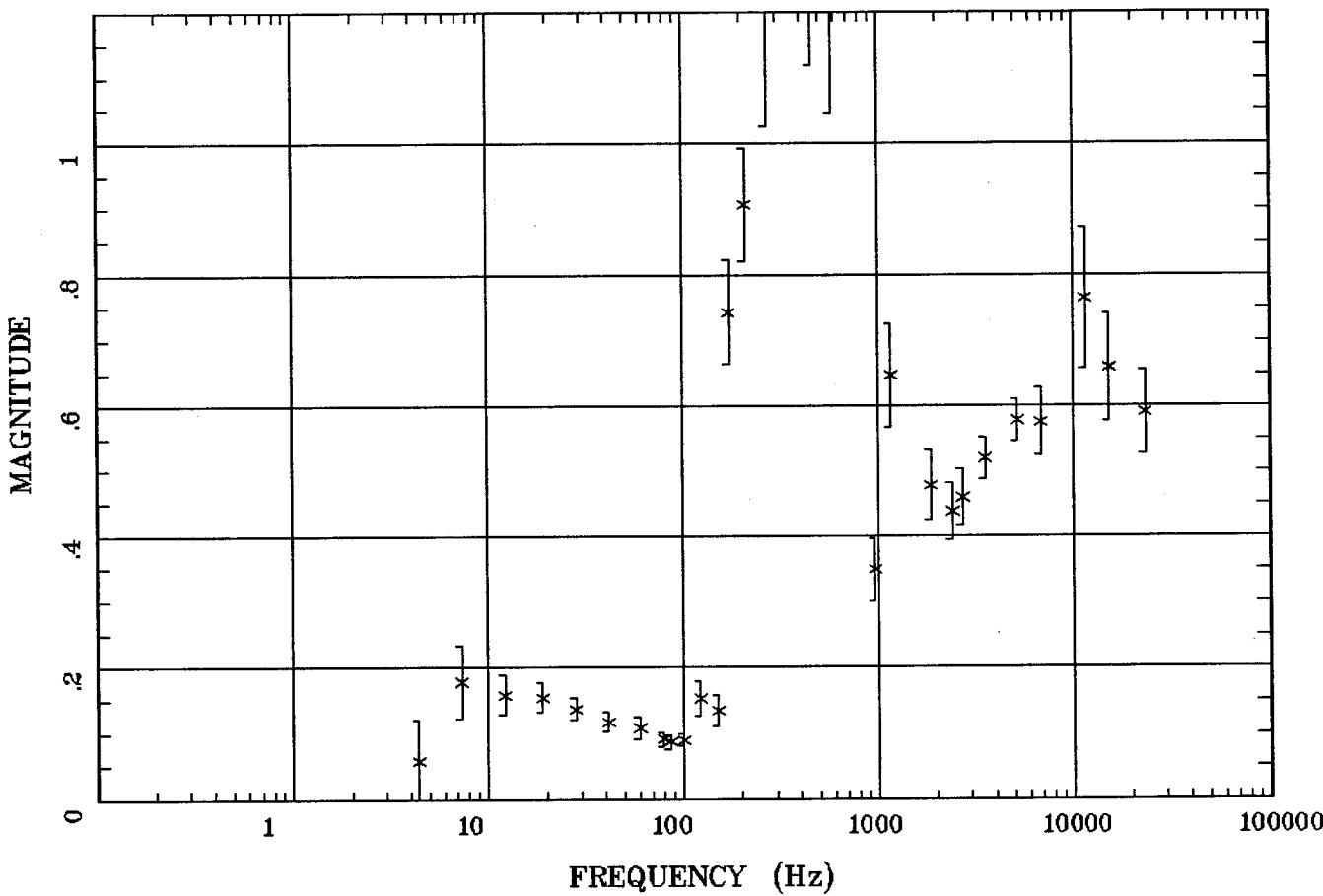
Remote: none

Acquired: 14:4 Nov 08, 2003

Survey Co:USGS

## TIPPER MAGNITUDE

Priority 4



Client: Water Resources

Remote: none

Acquired: 14:4 Nov 08, 2003

Survey Co:USGS

Rotation:

Filename: nts51.avg

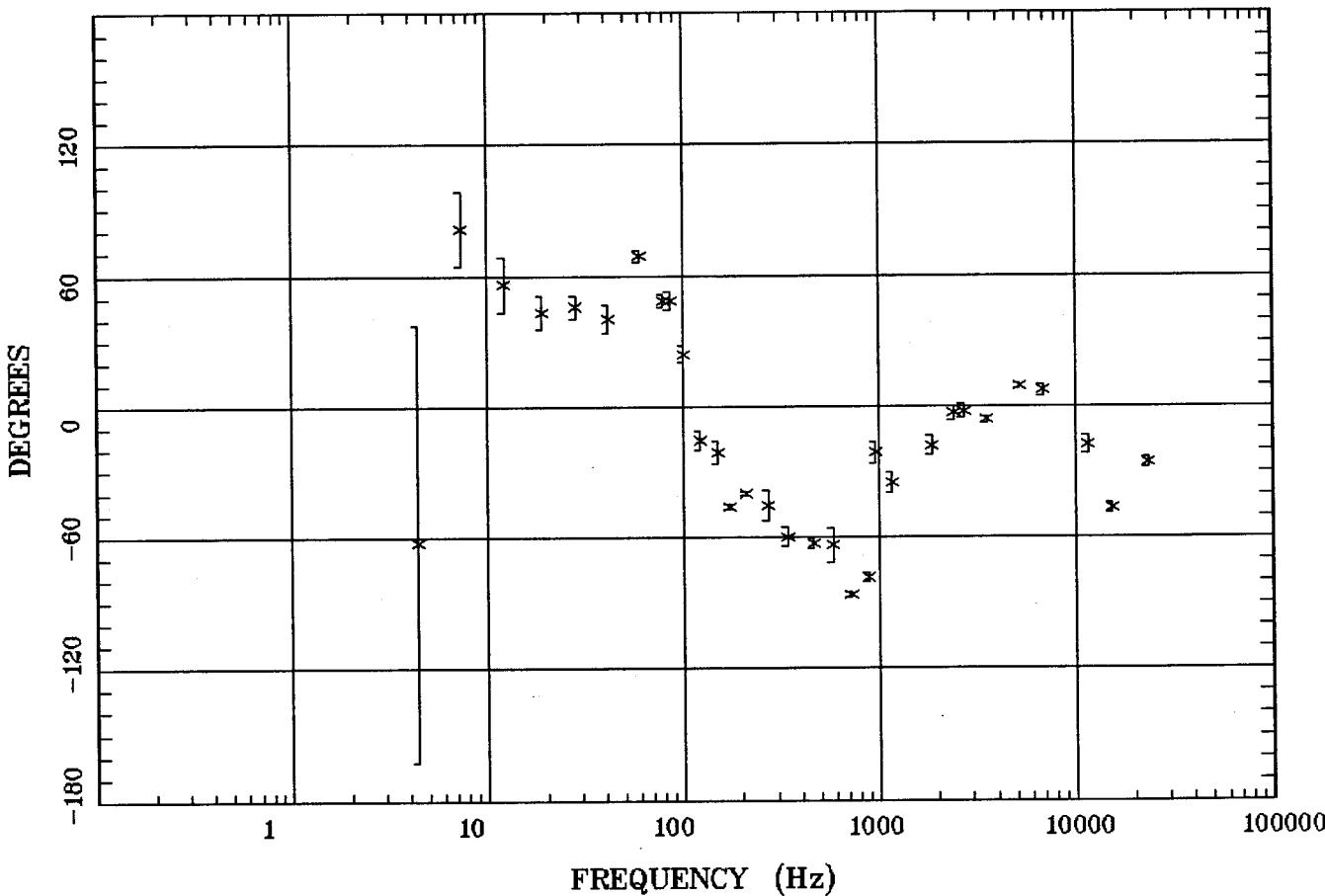
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:15 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

## TIPPER STRIKE

Priority 4



Client: Water Resources

Remote: none

Acquired: 14:4 Nov 08, 2003

Survey Co:USGS

Rotation:

Filename: nts51.avg

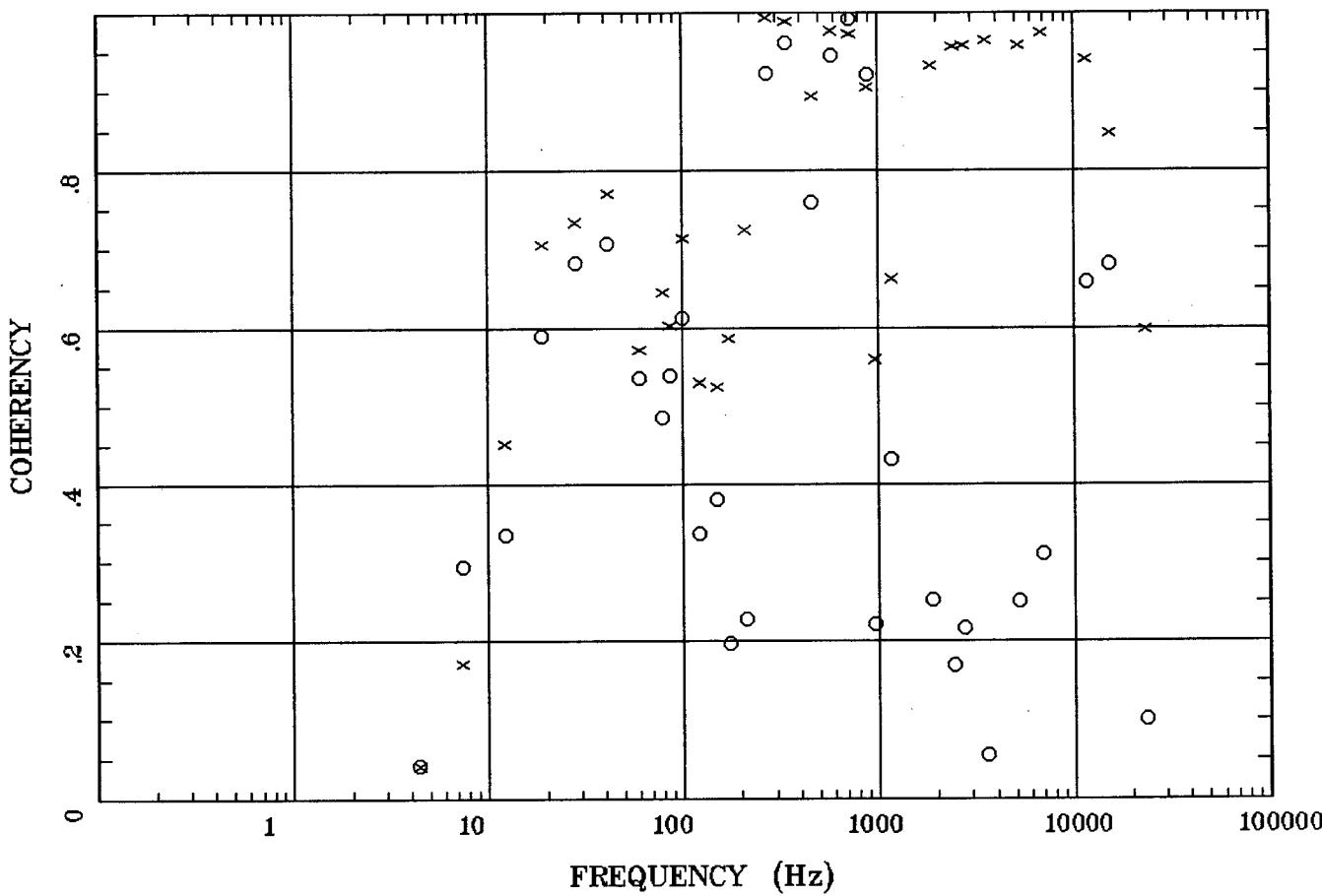
Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:15 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;

HzHx.x Coh HzHy.o

Priority 4



Client: Water Resources

Remote: none

Acquired: 14:4 Nov 08, 2003

Survey Co:USGS

Rotation:

Filename: nts51.avg

Channels: Ch1 Ch2 Ch3 Ch4 Ch5 Ch3 Ch4

Plotted: 11:15 Dec 09, 2004

&lt; EMI - ElectroMagnetic Instruments &gt;